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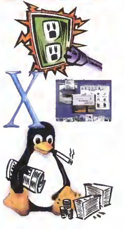

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The digital lifestyle

We've followed the Consumer Electronics Show (CES) for a number of years, and at one time considered it too far from mainstream computing to warrant detailed coverage. Five years ago, the event showcased lots of consumer electronics gadgets that had little to do with how we then perceived computing. While that's still largely true, a scan at this year's CES, which took place the first week of January in Las Vegas, showed that digital convergence continues to blur the lines between computing and consumer electronics.

To start with, some of the big names giving keynote addresses came from the heart of mainstream computing—3Com's Eric Benhamou, Microsoft's Bill Gates, and Sun Microsystems's Scott McNealy—and some of the themes were those we hear at computer trade shows like Comdex or PC Expo. Take Bluetooth, for example.

Bluetooth is best described as a cable replacement technology that can wirelessly link devices that are currently connected by cable. When analysts talk about access to digital connectivity they often refer to "last mile" technologies that are needed to bring services from the main trunks to our homes and offices. Think of Bluetooth as a kind of "last metre" technology, addressing the issue of how a person might want to organize and connect a digital environment within the confines of a single space.

In its current specification (1.0), Bluetooth has a range of 10 m (32.8 ft.) and a maximum data transmission rate of 1 Mbps. Among the founding members of the Bluetooth group were cell phone companies whose intent was to develop a wireless alternative to cables for connecting their phones to other digital devices. To be incorporated into a cell phone, the transceivers needed to be both small and energy efficient. Out of those design constraints came a technology that could be incorporated in a wide range of digital devices.

An obvious example from the computing world of how this technology can be employed is docking a personal digital appliance (PDA) to a PC. Currently, if I want to synchronize my handheld with a desktop PC, I need to connect the two via a serial port. I can wirelessly synchronize the handheld with my infrared (IR) port-enabled notebook, but the two IR ports need to maintain a line of sight. This isn't a problem for devices with Bluetooth, as it uses radio frequency (RF) technology, so no line of sight is needed.

With developments such as Bluetooth, in the near future, you might be able to set your computer and organizer so they constantly synchronize when in range of each other. Or you could set your cell phone to dial your ISP on your commute to work, and have the phone download email to your notebook computer as it sits in its carry bag. When you arrive at your destination and flip open your notebook, the latest messages will be ready for your perusal. As a tourist, you could approach a Bluetooth-enabled kiosk and have it download a local city map or restaurant guide to your PDA. These are some scenarios Bluetooth supporters hope to one day realize.

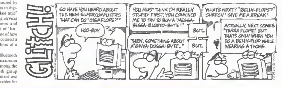
Bluetooth-enabled home products could include most home entertainment products (TVs, stereos, camcorder, etc.) and of course the telephone. A Bluetooth-enabled telephone could allow you to surf the Web from your Bluetooth-enabled TV or download MP3 files to your Bluetooth-enabled stereo. On the down side, you'd have to worry about bands of roving crackers trying to fool your phone into disarming the Bluetooth security system or activating the Bluetooth garage door opener.

Those possibilities—and concerns—may some day be real, but the technology has a ways to go before it achieves that level of penetration in our homes and offices.

At Comdex in November, I saw what was billed as the first public demonstration of a Bluetooth data transfer. In the demo, an image was transmitted from a digital camera to a desktop computer through a link between two digital cellular phones. In the first step, the image data was transferred from the digital camera to the first cell phone using Bluetooth. The cell phone then transmitted the data to the second phone. In the demo, the phones were just metres apart, but they could just as easily have been on opposite sides of the globe. The second cell phone then transmitted the data it was receiving to a nearby notebook computer, again using Bluetooth.

Not as monumental as Alexander Graham Bell's "Mr Watson, come here. I need you" utterance that ushered in the age of telephony, but a cool "look ma, no wires" demo in its own right.

Interesting times ahead!
David Tanaka, Editor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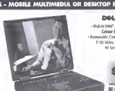

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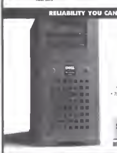

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Y1K to Y2K comment and corrections

The extensive history of computing in the January, 2000 issue was excellent but not without errors. Perhaps this additional Canadian perspective will interest your readers.

Nathan Segal wrote (see "A short history of computers") that Herman Hollerith's original company eventually became "the Calculating [sic] Tabulating Recording [C-T-R] Company in 1914, and in 1924 it was renamed International Business Machines (IBM)." The historical fact is that the Canadian branch of the Computing-Tabulating Recording company changed its name to International Business Machines Company in 1917, seven years before the parent company name-change.

It can be duly reported that "IBM" began in Canada.

Mr Segal and Jeff Evans (see "From Y1K to Y2K") both erred in reference to Hollerith's achievements. His machines were first used on the 1890 U.S. census (not 1880) and the completion time was two and a half years (not six weeks)—still less than a third of the time of the previous (1880) census.

George Dunbar

You have omitted the designation of the first operating electronic digital computer that was programmable and had internally stored programs, namely EDSAC at the University of Cambridge that first ran in 1949 spring (May or June). These developments in the Mathematical Laboratory of Cambridge University were, of course, a direct outcome of efforts in England related to work by [Charles] Babbage, [Alan] Turing and others to whom you allude or refer specifically.

Terry Oliver

I picked up *The Computer Paper* and read your article "From Y1K to Y2K." I had to email you to say it was absolutely great, well written, informative and frankly the best history of computing I have read to date. I hope you are going to put it on the Web site so I can send it to tons of people including a few teachers. Thank you for a good read and can't wait to share it.

Anne Stirling

Digicam review too high end

Like the reader that wrote in your January issue, many of us are thirsty for digicam information and comparisons showing Canadian prices. So when I saw that you would be reviewing digital cameras in that issue, I was very excited. My excitement turned to disappointment very quickly.

Of the 25 cameras you reviewed only five were under $1,000. While cameras listing for more are typically superior to their less expensive cousins, I have met very few people who would consider spending almost $1,500 for their first attempt at digital photography.

I was particularly amazed at the lack of any budget Olympus or Canon cameras in the review. An uneducated shopper might come to the conclusion that Kodak was the only brand that offered anything inexpensive. It might also indicate that nothing under $1,000 was worth buying.

I understand that your hands are often tied when it comes to getting submissions from various companies in time for review. So, could you include some links where people could find other comparisons that might include the models they were considering?

Karl Plase

TCP replies. *Your point is well taken. As a general rule, lower resolution cameras are less expensive, but would serve you well as long as you understand their imaging limitations. "Photographic print equivalence" is an arbitrary but useful measure of the best image quality various digital cameras will deliver, when compared to prints from a 35 mm film camera. The best that a 640x480 pixel image will deliver is about the same as a 4x6 inch photographic print. A one megapixel camera will produce 5x7 inch images at the same quality as photographic prints, and a two megapixel camera should deliver 8x10 inch prints.*

This is only a rough measure because image quality also depends on the sharpness of the lens (more expensive cameras tend to have better optics) and the effectiveness of the algorithms used to convert the image elements captured by the sensor into a coherent photographic image (some manufacturers do this better than others).

When you are shopping, find a dealer who will allow you to print test images on an inkjet printer comparable to the one you have, or to download test images and take them home on a floppy disk so you can do your own test prints.

Take this rebate and

I enter the year 2000 firmly resolved to never purchase another item of computer hardware or software where part of the purchase price

Continued on page 22

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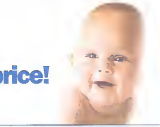

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WHAT'S NEW

iCraveTV.com plans to Webcast in U.S.

TORONTO—A Canadian Web site that drew fire from the television industry after it began relaying broadcast signals across the Internet says it's ready to bargain with its critics. But the bargaining—if there is any—is over a whole new deal: iCraveTV.com's plan to pipe Canadian content into the U.S.

The company relays signals from 17 channels that are currently available off the airwaves over its home base of Toronto. Those channels represent most of Canada's broadcast television networks—including the CBC—as well as such U.S.-based services as NBC, CBS, ABC, Fox, and PBS.

While Canadian regulators have specifically exempted Internet activities from the Broadcast Act, no such free-wheeling situation exists in the U.S., so iCraveTV.com (http://www.icravetv.com) has been promoted as being for "Canadians' eyes only" since it was launched in December.

"But I'm getting a lot of email from Americans wanting to watch our service," iCraveTV.com president Bill Craig said. "And they're not just focused on American programming."

A solution that Craig says may be lucrative for his company and for some Canadian broadcasters could be to open up just the Canadian content for viewing in the U.S. and elsewhere.

Currently, visitors to the site must enter a Canadian telephone area code to gain access to the iCraveTV.com signals relayed via their RealPlayer streaming video viewers.

Said Craig, "I thought, why don't we do it this way ... the barriers could come down for [U.S. viewers] when there is product that has been cleared for U.S. distribution. And the easiest distribution is programming that hitherto has not done very well in the U.S.: Canadian content."

The hitch is getting producers of Canadian content who are eager to participate in such a project. Craig said he thinks he might get willing participants if he can show them they may be able to make money in the process.

He said the statistics are in for iCraveTV.com's first full month of operation and they show that the site received 600,000 visits in December, served up 20.1 million banner impressions off its Web pages and 60 million impressions of advertising space that appears for 30 seconds at a time beneath the video signal within the RealPlayer.

Said Craig, "We should be able to go to [producers] and say, 'Look, why don't we figure out some method of payment based on upon how much ad revenue we sell, or you guys insert commercials that are separate from Internet commercials—separate from their over-the-air signals—and we'll facilitate that.'

"We'll create the promotional platform in the United States for Canadian programming."

Craig said that, technically, his company could begin such a service in less than a month, but that he'd like to talk with Canadian content providers first. "I've had a couple of chats with people on a non-disclosure basis and they are quite intrigued by the idea," he said.

Critics of the iCraveTV.com service say it's debatable whether or not U.S. viewers are really prohibited from accessing the full array of iCraveTV.com content now, since coming up with a Canadian telephone area code is fairly simple.

Craig said the company had no plans yet to change its system for screening U.S. viewers, a system that essentially amounts to an honour system.

—*Newsbytes*

Compaq rolls out easy-to-use PC

LAS VEGAS—Seeking to become a force in the Internet era, Compaq Computer (http://www.compaq.com) unveiled an easy-to-use Internet-ready PC at the Consumer Electronics Show (CES) in Las Vegas in early January.

The Presario EZ 2000—which looks like an old-style toaster or antique radio—joins other colourful, Net-ready PCs, such as Dell's WebPC and Apple's iMac. The EZ 2000 offers a suite of Internet keyboard buttons that let users link directly to favourite Web sites. Its most unique feature: a car-style "digital dashboard" that sports a small window with a clock and a light that shows when email has arrived. The EZ 2000—which includes a CD-ROM drive, but no monitor or printer—starts at US$999.

"This is a big step in making PCs a lot easier to use," says Mark Larson, head of Compaq's Consumer Business Unit, "from setting it up from the box to plugging in peripherals."

The new Presario is part of Compaq's strategy to reshape the Houston-based firm, the top PC maker in the world, as a strong Internet player. Under the leadership of its new chief executive officer Michael Capellas, Compaq has announced several Internet-friendly products: the iPaq, a corporate desktop PC due early this year, and the Clipper, a small Internet appliance that is in development.

—*Newsbytes*

Corel, Creative boost Linux desktop apps

MILPITAS, Calif.—Sound Blaster Live and Personal Digital Entertainment products will be available to desktop users of the Linux operating system (OS), according to recent announcements from Corel Corp. (http://www.corel.ca) and Creative Technology Ltd. (http://www.creative.com/).

The companies said they have formed a partnership to develop Linux applications for high-quality online audio and video. They will work together to generate support for Sound Blaster Live digital audio solutions and Personal Digital Entertainment (PDE) Internet products, including Internet devices, applications and services.

Part of the collaborative effort will see Corel distribute its upcoming Linux-based suite of applications with support for Creative's industry-standard audio solutions and PDE devices bundled in, the firms said. Creative and Corel will team to develop Linux drivers for Creative's branded products.

Creative's WebCam Go portable PC camera

Creative's PDE line includes NOMAD portable audio devices and the WebCam Go line of portable PC cameras. Sound Blaster Live drivers for Linux are already available and will, under the new agreement, be customized for Corel's distribution, the partners reported.

—*Newsbytes*

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ASUS P3B-1394 440BX IEEE 1394 Ready Board	$279.00
ASUS P2B-DS 440BX Dual CPU Ultra2SCSI Board	$880.00
ASUS P3C-E i820 133MHz Rambus Pentium III Board	$255.00
PC Partner VIA VP3 100MHz AGP Socket 7 512KB L2	$[illegible]

MultiMedia

Aureal Vortex 2 SuperQuad A3D 2.0 Sound Card	$68.00
Creative Labs Sound Blaster Ensoniq PC /PCI 128	$32/45
Creative Labs Sound Blaster Live! MP3+/X-Gamer	$130.00
Creative Labs Sound Blaster Live! Platinum/Live Value	$275/70
Creative Labs PC-DVD RAM Internal 5.2GB Drive	$420.00
50X IDE CD-ROM Drive	$57.00
Hewlett Packard 8210i/e 8x4x32 SCSI/USB CDRW	$485/595
8x/10x DVD ROM Drive	$132/154
Plextor 8432 Int IDE CDRW	$399.50
Toshiba 40X SCSI CD ROM Drive	$128.50
Yamaha 8424LS Int DL/SCSI CDRW	$185.45

Modem & Mice

56Kbps V.90 PCI Int. Modem w/Voice	$25.00
Diamond SupraMax 56K v.90 PCI Voice	$54.00
US Robotics 56K v.90 Int/Ext Fax Modem	$80/175
US Robotics 56K v.90 USB Pro Ext Modem	$220.00
Zoltrix 56K v.90 External Fax Modem	$92.00
Genius NetMouse with Magic-Button	$12.00
Logitech Mouseman/FirstMouse+ OEM	$18.00
Logitech Cordless Wheel Mouse	$52.00
Logitech TrackMan Marble Wheel/Marble FX	$67/102
Microsoft Basic Mouse/Cordless Wheel Mice	$17/58
Microsoft Trackball Mouse/IntelliMouse	$18/22
Microsoft IntelliMouse Optical Tech/Explorer	$63/68
Microsoft Compatible Mouse	$5.50

Printers

Canon BJC-1000/BJC-2000SE ($20 rebate)	$9[illegible]/148
Canon BJC-5100 Color Inkjet	$225.00
Canon BJC-6100 Color Inkjet	$325.00
Brother HL 1020 Laser Printer 600dpi 10ppm	$315.00
Epson Stylus 440/660 Inkjet(US$30 rebate)	$164/199
Epson 740i Inkjet for iMac(US$50 rebate)	$345.00
Epson Stylus 760 Inkjet(US$30 rebate)	$345.00
Epson Stylus 860/900N Color Inkjet 1440dpi	$372/730
Epson Stylus 900 Color Inkjet 1440dpi	$580.00
HP 610CL/810C Deskjet Color Printer	$159/235
HP 820C/880C Deskjet Color Printer	$305/385
HP 895Cxi/970Cse Deskjet Color Printer	$450/555
HP P1000/P1100 PhotoSmart Color Printer	$615/730
HP 1120C/2000C Deskjet Color Printer	$580/700
HP 2000C/2500CM Professional Printer	$1410/2180
HP [illegible]00/[illegible]00A Laserjet 600 dpi 8 ppm	$580/7[illegible]
HP [illegible] Laserjet [illegible] 10 ppm	$10[illegible]

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Pentium III~Game Blaster

Intel Pentium III Processor with MMX Technology
Abit BE6 440BX AGP/PCI/ISA ATX Main Board
64MB 168 Pin SDRAM (PC100MHz)
1.44MB Floppy Drive
13GB Ultra DMA-66 7200RPM IDE Hard Drive
Ultra DMA66 Cont. w/2x16550 Serial,1xBi-Directional Parallel
AGP 34fx Voodoo 3000 Graphics Card with 16MB
Creative Labs Live! Value Card-Environmental Audio
3rd Generation DVD-ROM Drive
MLI-480 Sub-woofer Speaker
Optiquest Q71 17" .27mm DP NI SVGA Monitor
ATX Mid Tower Case with CSA Power Supply
107 keys Windows 98 Keyboard,PS/2 Mouse
2 Year Parts & Service Warranty

PIII 500MHz 512KB L2 ...	$1,750
PIII 550MHz 512KB L2 ...	$1,920
PIII 600MHz 512KB L2 ...	$2,120
PIII 650MHz 256KB L2 ...	$2,270
PIII 700MHz 256KB L2 ...	$2,540

Ultimate Power Station

New Intel Pentium III Processor/133MHz Bus
AOpen AX63 Pro VIA Apollo Pro 133 ATX Board
64MB 168 Pin SDRAM (PC133MHz)
1.44MB Floppy Drive
13GB Ultra DMA-66 7200RPM IDE Hard Drive
Ultra DMA66 Cont. w/2x16550 Serial,1xBi-Directional Parallel
AGP Creative Labs S3 Savage 4 Card w/32MB
Aureal Vortex 2 SuperQuad A3D 2.0 Sound Card
3rd Generation 10X DVD-ROM Drive
Altec Lansing 45 2 Sub-woofer Speaker
Samsung 750S 17" .27mm DP NI SVGA Monitor
ATX Mid Tower Case with CSA Power Supply
107 keys Windows 98 Keyboard,PS/2 Mouse
2 Year Parts & Service Warranty

PIII 533MHz 256KB L2...	$1,745
PIII 600MHz 256KB L2...	$2,000
PIII 667MHz 256KB L2...	$2,210
PIII 733MHz 256KB L2...	$2,485

MEMORY SALE!

16MB 60ns 72-Pin EDO SIMM	$44.00
32MB 60ns 72-Pin EDO SIMM	$83.00
32MB SDRAM PC-100 compliant	$63.00
64MB SDRAM PC-100 compliant	$120.00
128MB SDRAM PC-100 compliant	$235.00
256MB SDRAM PC-100 compliant	$540.00
64MB SDRAM PC-133 compliant	$135.00
128MB SDRAM PC-133 compliant	$250.00
128MB ECC SDRAM PC-100	$285.00
256MB ECC SDRAM PC-100	$620.00

BASF/Verbatim/Sony CDR

BASF CDR - $1.80
Verbatim CDR - $2.20
BASF CDRW - $3.45

Iomega Zip

100MB Zip Disk
$12.50

56K Modem

V.90 Internal Fax Voice Modem
$25.00

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NOVELL Software

NetWare v3.2

NetWare v3.2 5/10 User	$1450/3020
NetWare v3.2 25/50 User	$5255/8850
NetWare v3.2 Enhancement Pack	$495

IntraNetWare v5

NetWare 5 Server Plus 5 User Lic	$1440
NetWare 5 5/10 Additive Lic. Only	$1210/1720
NetWare 5 25/50 Additive Lic. Only	$3550/6570

Netware Small Business Suite v5

Netware Small Business v5 Server w/5 user	$1580
Netware Small Business v5 Connection Lic	$66

MICROSOFT NT

Windows NT Server v4.0 CD w/5 Clients Lic	$1075
Windows NT Server v4.0 CD w/15 Clients Lic	$1510
Windows NT v4.0 Client Access Lic	$48
Windows NT Server v4.0 upgrade w/5 Clients Lic.	$443
Windows NT Server v4.0 upgrade w/15 Clients Lic	$[illegible]
Windows NT Workstation 4.0 CD	$428
Windows NT Workstation 4.0 upgrade	$208
BackOffice Small Business Server v4.5 w/5 Clients	$2845
BackOffice Server v4.5 w/5 Clients	$4245
Microsoft SMS version 2.0 w/10 Clients Lic.	$1538
Microsoft SMS version 2.0 w/25 Clients Lic	$2425
Microsoft SNA Server v4.0 w/5 Clients Lic	$1820

Network Printers

Lexmark
1200dpi Image Quality
$1050.00

HP 4000 Laserjet 1200dpi 17ppm	$1895
HP 4000N Laserjet,1200dpi 17ppm 8MB,Network	$2190
HP 4050TN Laserjet,1200 dpi 17ppm 16MB,Network	$2395
HP 8000 Laserjet 1200dpi 16ppm,11x17"	$3235
HP 5000N Laserjet,1200dpi 16ppm 11x17" Network	$3185
HP 5000GN Laserjet,1200dpi Graphics Intensive	$3085
HP 8100 Laserjet 1200dpi,32ppm	$4050
HP 8100N Laserjet,1200dpi 32ppm Network	$4480
HP 8100DN Laserjet 1200dpi,32ppm Duplexer	$5175
HP 4500 Color Laserjet,600dpi(Ret/1400),32MB	$3790
HP 8500N Color Laserjet 600dpi,64MB,Network	$4480
HP 8500 Color Laserjet,600dpi 12x18" 32MB	$6975
HP 8500N Color Laserjet 600dpi 32MB Network	$10185
Lexmark Optra E310 8ppm,2MB	$575
Lexmark Optra M410n 12ppm,4MB USB	$1275
Lexmark Optra T610 15ppm,8MB Parallel	$1030
Lexmark Optra T610n 15ppm 8MB 10/100BaseTx	$1960
Lexmark Optra T612 20ppm 8MB Parallel & Serial	$1735
Lexmark Optra T612n 20ppm 16MB 10/100BaseTx	$2245
Lexmark Optra T616 25ppm,8MB Parallel	$2795
Lexmark Optra T614n 25ppm 16MB 10/100BaseTx	$3335
Lexmark Optra T616 35ppm 16MB Parallel	$3430
Lexmark Optra T616n 35ppm 16MB 10/100BaseTx	$3833
Lexmark Optra W815 35ppm 16MB 11x17" Parallel	$4060
Lexmark Optra W810n 35ppm 16MB 11x17" Network	$4525
Lexmark Optra SC 1275 3ppm 16MB 300dpi	$3030
Lexmark Optra SC 1275N 3ppm 32MB 600dpi	$3670
Lexmark Optra Color 1200 12ppm 1200dpi 11x17"	$7550
Lexmark Optra Color 1200N [illegible]	$8735

Tape / CD ROM Drives

Exabyte Eliant 820 14GB Int/Ext Tape Drive	$1600/1920
Hewlett Packard SureStore 6GB Int/Ext DAT Drive	$[illegible]
Hewlett Packard SureStore 24GB Int/Ext DAT Drive	$1300/1480
Hewlett Packard SureStore 40GB Int/Ext DDS-4 DAT	$1730/1985
Hewlett Packard SureStore DLT 40GB SCSI Drive	$2930/3250
Hewlett Packard SureStore DLT 70GB SCSI Drive	$7225/7580
Hewlett Packard SureStore DLT 80GB SCSI Drive	$7660/7885
Hewlett Packard SureStore T20 20GB Int/Ext Drive	$[illegible]
Onstream 30GB IDE/SCSI Int Drive Echo SW Incl	$415/565
Onstream 50GB SCSI Int Drive Echo SW Incl.	$875
Seagate Scorpion 8GB DAT Int/Ext Drive	$750/870
Seagate Scorpion 24GB DAT Int/Ext Drive	$1000/1235
Seagate Scorpion 40GB DAT Int/Ext Drive	$3170/3500
Seagate TapeStore 20GB Int IDE/SCSI Tape Drive	$[illegible]
Sony SuperStation 10GB Int/Ext Drive	$[illegible]
Sony SDT 7000 Int/Ext. 4-8GB DAT	$[illegible]
Sony SDT 9000 Int/Ext. 24GB DAT	$1180/1290
Sony SDT [illegible] Int 40GB DDS-4 DAT SCSI	$[illegible]
Sony AIT 200GB Int/Ext [illegible]	$5570/6850

Power Protection

$138.00

American Power 120 Volt

BackUPS 200/300	$120/135
BackUPS 500/650	$180/246
BackUPS Pro 280/350/420	$252/245/35[illegible]
BackUPS Pro 560/650	$335/405
BackUPS Pro 1000/1400	$545/700
SmartUPS SU420/SU620	$345/430
SmartUPS SU700/SU1000/SU1400	$[illegible]
SmartUPS SU2200/SU3000	$1285/2055
Back UPS Office BF280	$173
Matrix 3000VA/5000VA (Modular UPS)	$3965/5770
SmartCELL for Matrix 3000/5000	$[illegible]
Line Conditioner LR600/LR1250	$120/[illegible]
Personal SurgeArrest 7/7 Outlets with Tel	$27/34
Professional SurgeArrest 7/7 Outlets with Tel	$43/55
Professional SurgeArrest 8/8 Outlets with Tel	$46/60
Network SurgeArrest 7/7 Outlets with Tel	$50/64
Notebook Surge Protector	$22

Cables & Tools

Twisted Pair

Assembly Cat 5 10/100BaseT Cable 3/15/25 ft	$8/10/12
Assembly Cat 5 10/100BaseT Cable 50/75/100 ft	$23/30/35
Cable Cat 5 10/100BaseT Cable per ft	$0.25
Cable Cat 5 10/100BaseT Cable per 1000 ft	$150
Connector RJ45M	$0.36
Tool RJ45 Crimping	$28
Multi-Network Cable Tester	$58

Coaxial

Assembly RG58/AU Thin Coax 25/50 ft	$15/22
Assembly RG58/AU Thin Coax 100 ft	$[illegible]
Cable RG58/AU Bulk per ft	$0.25
Cable RG58/AU Bulk per 1000 ft	$159
Connector BNC "T"	$2.00
Terminator BNC 50 ohm	$1.00
Tool BNC Crimping	$[illegible]
Terminator BNC 50 ohm w ground strap	$3.00

10BaseT/2 Adapters

3COM 3C509B-TPC ISA Ethernet Combo	$102
3COM 3C900B-TPC Ethernet XL Combo	$105
AOpen PCI Ethernet Combo	$18
D-Link DE-220PCT ISA Ethernet Combo	$28
D-Link DE-528CT+ PCI Ethernet Combo	$32
Intel PCLA8110B ISA EtherExpress Pro 10+ Combo	$[illegible]
Intel PCLA8615 ISA EtherExpress Pro 10+ Flash Combo	$1[illegible]5
Intel PILA8500 PCI EtherExpress Pro 10+ Combo	$[illegible]
SMC 1208BT PCI EZCard Combo	$55
SMC 8416T ISA EtherEZ Combo	$50
SMC 9432BTX PCI EtherPower Combo	$60

Print Servers & USB

HP JetDirect J3258B 170X 10BaseT Ext. Print Server	$[illegible]
HP JetDirect J4100A 400N 10/100BaseT Print Server	$595
HP JetDirect J3263A 300X 10/100BaseT Ext Print Server	$355
HP JetDirect J3265A 500X 10/100BaseT Ext Print Server	$455
HP JetDirect J3110A 600N RJ45	$355
HP JetDirect J4135A USB Connectivity Card	$158
Intel NetportExpress Pro Ext. Printer Server PCLA2151	$378
Intel NetportExpress 10/100 Ext. Printer Server 1 Port	$315
Intel NetportExpress 10/100 Ext. Printer Server 3 Port	$458
Intel InBusiness Print Station SP8110TX2US	$238
Netgear PS104 4 Port 10BaseT Print Server	$140
Netgear PS110 10/100BT Print Server	$182
Xircom PortGear USB Hub 4 Port	$75
Xircom PortGear USB Hub 7 Port	$122

PCMCIA Adapters

D-Link DE-660CT PCMCIA Ethernet NE2000 Compatible	$115
Xircom RealPort 10/100 Ethernet + 56K v.90 Modem	$[illegible]
Xircom RealPort 10/100 Fast Ethernet CardBus	$[illegible]
Xircom RealPort RM56 56K v.90 Modem	$198
Xircom PCMCIA CM-56 56Kbps Modem	$154
Xircom PCMCIA 10/100 Ethernet + 56K Modem	$[illegible]
Xircom [illegible] 10/100 Ethernet Card	$[illegible]

10 BaseT Hubs

3COM 3C16440 SuperStack Entry Hub 12 Port	$2[illegible]
3COM 3C16441 SuperStack Entry Hub 24 Port	$385
3COM 3C16405 SuperStack PSH Hub 40 12 Port	$715
3COM 3C16406 SuperStack PSH Hub 40 24 Port	$1235
3COM 3C16450 SuperStack PSH Hub 50 24 Port	$1240
3COM 3C16670A SuperStack II Hub 10 12 Port	$740
3COM 3C16671A SuperStack II Hub 10 24 Port	$1205
3COM 3C16410 SuperStack II Dual Speed Hub 12 Port	$850
3COM 3C16411 SuperStack II Dual Speed Hub 24 Port	$1310
3COM 3C16700A OfficeConnect 8/TPO	$118
3COM 3C16701A OfficeConnect 8/TPC	$140
3COM 3C16702A OfficeConnect 16/TPC	$550
3COM 3C16704A OfficeConnect 4/TPO	$[illegible]
3COM 3C16718 OfficeConnect 8/TPM	$408
AOpen SOHO-5+ 5 Port/8 Port Hub	$45/58
D-Link DE-805TP/C 5 Port Hub	$[illegible]
D-Link DE-809TC 8 Port Hub	$[illegible]
D-Link DE-812TP 12 Port Hub	$205
D-Link DE-816TP 16 Port Hub	$228
D-Link DE-824TP 24 Port Hub	$380
Intel InBusiness SH10T5 5 Port Hub	$71
Intel InBusiness SH10TBUS 8 Port Hub	$89
Intel InBusiness SH10TB8 8 Port Hub (with coax)	$115
Intel InBusiness SR11TPSUS Internet Station	$575
Netgear EN104TP NA/EN104NA 4 Port Hub	$42/5[illegible]
Netgear EN106TP 6 Port Hub	$54
Netgear EN108TP NA/EN108NA 8 Port Hub	$52/78
Netgear EN116NA 16 Port Hub	$128
SMC 3605T-EZ 5 Port Hub	$[illegible]
SMC 3608T-EZ 8 Port Hub	$[illegible]
SMC 3616TC-EZ 16 Port Hub (with coax)	$[illegible]

10 BaseT Adapters

3COM 3C509B-TPO/3C900B ISA/PCI Ethernet TPO	$[illegible]
3COM 3C19250 10BaseT USB Network Interface	$[illegible]
Intel PCLA8205 ISA EtherExpress Pro 10+ 10BaseT	$[illegible]
Intel PILA8520 PCI EtherExpress Pro 10+ 10BaseT	$120
Netgear EA101C 10BaseT USB Network Interface	$65

Switches

3COM 3C[illegible] OfficeConnect Switch [illegible] 10BaseT	$[illegible]
3COM 3C16951 SuperStack II Switch 1100 12 Port	$[illegible]
3COM 3C16950 SuperStack II Switch 1100 24 Port	$[illegible]
3COM 3C16981 SuperStack II Switch 3300 12 Port	$[illegible]
3COM 3C16980 SuperStack II Switch 3300 24 Port	$[illegible]
3COM 3C39024 SuperStack II Switch 3900 24 Port	$[illegible]
CISCO Catalyst 2912XL A 10/100 Switch 12 Port	$[illegible]
CISCO Catalyst 2924-XL A 10/100 Switch 24 Port	$[illegible]
HP J4120A ProCurve 1600M 16 Port 10/100 Switch	$[illegible]
HP J4121A ProCurve 4000M 40 Port 10/100 Switch	$[illegible]
Intel InBusiness SS101TX8 8 Port Switch	$[illegible]
Intel Express 410T 10/100 Standalone Switch 16 Port	$[illegible]
Intel Express 410T 10/100 Standalone Switch 24 Port	$[illegible]
Intel Express 520T 10/100 Scalable Switch 12 Port	$[illegible]
Intel Express ES1000SXPUS Gigabit Switch 7 Port	$[illegible]
Netgear FS 608NA 2 10/100BaseT Port Switch	$[illegible]
Netgear FS105 5 10/100BaseT Port Switch(Small net)	$[illegible]
Netgear FS108NA 8 10/100BaseT Port Switch	$[illegible]

100/1000 Mbps Systems

Fast Ethernet Adapter
$73.00

3COM 3C905C TX M FastEtherLink PC Management	$[illegible]
3COM 3C905B-COMBO Fast EtherLink 10/100 Combo	$[illegible]
3COM 3C980B-TX Fast EtherLink Server Card	$[illegible]
3COM 3C985B SX Gigabit EtherLink Server Card	$[illegible]
3COM 3C16722 OfficeConnect FastEthernet 8 Port Hub	$[illegible]
3COM 3C16721 OfficeConnect FastEthernet 12 Port Hub	$[illegible]
3COM 3C15750 OfficeConnect 10/100 8 Port Hub	$[illegible]
3COM 3C16751 OfficeConnect 10/100 16 Port Hub	$[illegible]
D-Link DFE-530TX 10/100 PCI FastEthernet Adapter	$[illegible]
D-Link DFE-570TX 10/100 4 Port PCI Server Adapter	$[illegible]
D-Link DFE-904 10/100 Dual Speed 8 Port Hub	$[illegible]
D-Link DFE-816 FastEthernet 16 Port Stackable Hub	$[illegible]
D-Link DSH-5 Dual Speed 10/100 5 Port Hub w/Switch	$[illegible]
D-Link DSH-8 Dual Speed 10/100 8 Port Hub w/Switch	$[illegible]
D-Link DSH-16 Dual Speed 10/100 16 Port Hub/Switch	$[illegible]
HP J4091A ProCurve 100BaseT 8 Port Hub	$[illegible]
HP J3294A ProCurve 10/100BaseT 12 Port Hub	$[illegible]
Intel PILA8460 Pro 100+ PCI Fast Ethernet Netgear	$[illegible]
Intel PILA8470 EtherExpress Pro/100+ Server Netgear	$[illegible]
Intel PILA8472 Pro 100+ Dual Port Server Netgear	$[illegible]
Intel PWLA8490 Pro/1000 Gigabit Server Adapter	$[illegible]
Intel InBusiness SH100TX4 FastEthernet 4 Port Hub	$[illegible]
Intel InBusiness SH100TX8 FastEthernet 8 Port Hub	$[illegible]
Intel InBusiness SH101TX8 FastEthernet 8 10/100 Hub	$[illegible]
Intel Express 330T Stackable Hub 10/100 16 Port	$[illegible]
Intel Express 330T Stackable Hub 10/100 24 Port	$[illegible]
Netgear FA310TX 100 PCI FastEthernet	$[illegible]
Netgear GA620NA Gigabit Ethernet Card	$[illegible]
Netgear FE104NA 100 4 Port Hub	$[illegible]
Netgear FE108NA 100 8 Port Hub	$[illegible]
Netgear DS104NA 10/100 Dual Speed 4 Port Hub	$[illegible]
Netgear DS106NA 10/100 Dual Speed 6 Port Hub	$[illegible]
Netgear DS108NA 10/100 Dual Speed 8 Port Hub	$[illegible]
Netgear DS516NA Dual Speed 16 Port Stackable Hub	$[illegible]
Netgear DS524NA Dual Speed 24 Port Stackable Hub	$[illegible]
SMC 1211TX EzCard 10/100Base-T PCI	$[illegible]
SMC 5208TX EZHub 100 8 Port Hub	$[illegible]

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Upgrading Your PC

free installation

VIA Apollo Pro Celeron AT Board with Vibra 16 On Board Sound (100MHz Bus)

- **Intel Celeron 400MHz w/128KB L2 . $220**
- **Intel Celeron 433MHz w/128KB L2 . $230**
- **Intel Celeron 466MHz w/128KB L2 . $260**
- **Intel Celeron 500MHz w/128KB L2 . $325**

VIA VP3 Super Socket 7 AT AGP Board with 512KB L2 Cache & Vibra 16 On Board Sound

- **AMD K6-2 3D 400 MHz $190**
- **AMD K6-2 3D 450 MHz $215**
- **AMD K6-2 3D 500 MHz $285**
- **AMD K6-3 3D 400 MHz $285**
- **AMD K6-3 3D 450 MHz $350**

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- True 600 x 600 dpi output
- Up to 12PPM
- 2MB RAM

$405

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- x 600 dpi
- RAM
- p to 12PPM

$555

OKIDATA Okipage 8w

Model	PPM	Res	Price
Okipage 6w	6	600dpi	$ 310
Okipage 8w	8	600x600	$ 389
Okipage 10e	10	600dpi	$ 460
Okipage 12i	12	600x600	$ 930
Okipage 16	16	600dpi	$1375
Okipage 24dx	24	600dpi	$1930

Microline DOT-MATRIX OKIDATA Printer

Model N/W	CPS	Pin	Price
ML184	300	9	$350
ML320/321	435	9	$500/705
ML520/521	435	9	$605/805
ML390/391	390	24	$525/705
ML395/Color	607	24	$1585/1695
ML590/591	360	24	$705/955

CREATIVE NVIDIA GeForce

Annihilator $345

Annihilator Pro $415

Creative Labs GeForce 256
- nVIDIA GeForce 256 GPU w/32MB
- Transform, Lighting, Setup, Rendering All-in-one Quad-Engine Design

100MB $85

250MB $165

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11.2Mb/sec data transfer rate, 20 times faster than floppy

$335

Millennium G400 Max
- 256 Bit DualBus Graphics Chip
- DualHead Display & TV Output
- 360MHz Ultrasharp DAC

$115

Mustek

Plug-N-Scan 1200CU
- 48 Bits/Pixel (enhanced)
- Optical Resolution 600x1200dpi
- Enhanced Resolution 19200dpi

QDI

$120

LegendX IV Main Board
- Support Dual CPU PIII Celeron
- Adaptec 7880 SCSI On Board
- Intel 10/100 LAN On Board

Microsoft

$62

explorer

MS Intellimouse Explorer
- New Optical Technology
- No ball to Clean
- Scroll wheel & 5 programmable buttons

3dfx 3dfx store

2000 AGP $139

3000 AGP $185 OEM

3500 AGP $[illegible]

Disc Storage

Seagate · CHEETAH · Western Digital · Quantum · FUJITSU

Capacity	Model	Access	Cache	RPM	Interface	Price
4.55GB	ST34520W	10ms	512KB	7200	ULTRA WIDE	$ 300
9.1GB	ST39140W	10ms	512KB	7200	ULTRA WIDE	$ 420
9.1GB	ST39175LW	6.9ms	1MB	7200	ULTRA 2 SCSI	$ 425
9.1GB	ST39103LW	5.6ms	1MB	10000	ULTRA 2 SCSI	$ 575
18.2GB	ST318275LW	6.9ms	1MB	7200	ULTRA 2 SCSI	$ 620
18.2GB	ST318203LW	5ms	1MB	10016	ULTRA 2 SCSI	$ 925
36.4GB	ST136475LW	8ms	1MB	7200	ULTRA 2 SCSI	$1285
36.4GB	ST136403LW	5.7ms	1MB	10000	ULTRA 2 SCSI	$1610
50.1GB	ST150176LW	7.4ms	1MB	7200	ULTRA 2 SCSI	$1370
9.1GB	309170U2	7ms	8MB	7200	ULTRA 2 SCSI	$ 420
9.1GB	39100LZX-LW	5.4ms	2MB	10000	ULTRA 2 SCSI	$ 620
18.2GB	318350U2	7ms	2MB	7200	ULTRA 2 SCSI	$ 700
18.2GB	18LZXU2	5.4ms	2MB	10000	ULTRA 2 SCSI	$1000
18.2GB	18ZXU2	5.3ms	4MB	10020	ULTRA 2 SCSI	$ 900
36GB	XP36U2	7.5ms	4MB	7200	ULTRA 2 SCSI	$1320
36GB	336000ZX-LW	5.4ms	2MB	10000	ULTRA 2 SCSI	$1645
9.1GB	WD9180-0048	8ms	2MB	7200	ULTRA 2 SCSI	$ 475
9.1GB	WD9150-0040	5.2ms	2MB	10000	ULTRA 2 SCSI	$ 620
9.1GB	WD9150-0051	5.2ms	8MB	10000	ULTRA 2 SCSI	$ 695
18GB	WD18300-048	8ms	2MB	7200	ULTRA 2 SCSI	$ 635
18.3GB	WD18310-040	5.2ms	2MB	10000	ULTRA 2 SCSI	$ 815
18.3GB	WD18310-050	5.2ms	8MB	10000	ULTRA 2 SCSI	$1045
9.1GB	QM309100KN	8.9ms	2MB	7200	ULTRA 2 SCSI	$ 385
9.1GB	QM309100TN	5ms	2MB	10000	ULTRA 2 SCSI	$ 570
18.2GB	QM318200KN	8.9ms	2MB	7200	ULTRA 2 SCSI	$ 630
18.2GB	QM318200TN	5ms	2MB	10000	ULTRA 2 SCSI	$ 910
36.4GB	QM336400KN	8.9ms	2MB	7200	ULTRA 2 SCSI	$1255
36.4GB	QM336400TN	5.5ms	2MB	10000	ULTRA 2 SCSI	$1625
9.1GB	MAE3091LP	10ms	256KB	7200	ULTRA 2 SCSI	$ 435
9.1GB	MAG3091LP	7.5ms	2MB	10000	ULTRA 2 SCSI	$ 630
18.2GB	MAE3182LP	10ms	256KB	7200	ULTRA 2 SCSI	$ 770
18.2GB	MAG3182LP	7.5ms	2MB	10000	ULTRA 2 SCSI	$1065

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ADA305 Digital PowerCube Speaker w/MultiChannel Surround	$[illegible]
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Model	CPU	RAM	HDD	CD	Display	Price
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
i1540	Cel433	64MB	4.8GB	24X	12.1 TFT	$2,670
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
240	Cel366	64MB	6.4GB		10.4 TFT	$2,810
390X	Cel400	64MB	4.8GB	24X	12.1 TFT	[illegible]
390X	PII400	64MB	6.4GB	24X	14.1 TFT	$4,100
390X	[illegible]	64MB	[illegible]	[illegible]	[illegible]	[illegible]
390X	P3-450	64MB	12GB	24X	14.1 TFT	$4,565
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
570	PII333	64MB	4.0GB		13.3 TFT	$4,320
570	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
600E	P3-450	64MB	6.0GB	24X	13.3 TFT	$4,565
600E	P3-500	64MB	[illegible]	[illegible]	13.3 TFT	[illegible]
600E	P3-500	64MB	12GB	DVD	13.3 TFT	$5,845

COMPAQ Presario 1694

AMD K6-2 450MHz CPU
64MB RAM
6.4GB Hard Drive
ATI Rage LT Pro Video 8MB
4X DVD ROM
56KBps Fax Modem
14.1" TFT Display

$2,8[illegible]

Model	CPU	RAM	HDD	CD	Display	Price
V300	[illegible]	32MB	4.3GB	24X	12.1 DSTN	$2,20[illegible]
[illegible]	Cel400	64MB	4.3GB	24X	12.1 TFT	$2,[illegible]
V300	Cel466	64MB	4.3GB	24X	14.1 TFT	$3,249
M300	PII333	64MB	4.3GB		11.3 TFT	$2,7[illegible]
M300	PII333	64MB	6.4GB		11.3 TFT	$3,510
M700	PII366	64MB	6.4GB	24X	14.1 TFT	[illegible]
M700	P3 450	64MB	6.0GB	24X	14.1 TFT	$5,055
M700	P3-500	64MB	12GB	24X	14.1 TFT	[illegible]
E500	PII366	64MB	4.3GB	24X	12.1 TFT	$3,090
E500	PII400	64MB	6.0GB	24X	14.1 TFT	[illegible]
E500	P3-450	64MB	5.0GB	24X	13.3 TFT	$3,675
E700	P3-450	64MB	12GB	24X	14.1 TFT	$4,4[illegible]
E700	PII400	128MB	14GB	DVD	14.1 TFT	$6,030
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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20X CD-ROM/built-in sound
12.1" DSTN Display
56KBps Fax Modem/USB

Model	CPU	RAM	HDD	CD	Display	Price
722TX	PII366	64MB	6GB	24X	14.1 TFT	[illegible]
[illegible]	[illegible]	[illegible]	6GB	DVD	14.1 TFT	[illegible]
723TX	PII400	64MB	10GB	24X	14.1 TFT	$3,590
[illegible]	PII400	64MB	10GB	DVD	14.1 TFT	[illegible]
512T	Cel366	32MB	4GB	24X	12.1 TFT	$2,155
[illegible]	Cel300	32MB	[illegible]	24X	[illegible]	[illegible]
513T	Cel400	64MB	4.3GB	24X	12.1 TFT	$2,350
[illegible]	PII366	64MB	[illegible]	24X	13.3 TFT	[illegible]
340T	PII450	64MB	6GB	24X	12.1 TFT	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PCMCIA / PC Cards

Adaptec APA-1360 MiniSCSI Parallel Port Kit	$87.00
Adaptec APA-1460D SlimSCSI Kit	$179.00
Adaptec APA-1480A UltraSCSI Kit (CardBus)	[illegible]
Adaptec USBS-2000 USB to SCSI Converter	[illegible]
Exp DVD Traveler Plus DVD ROM w/Software	$474.00
Exp DVD Traveler Plus DVD w/MPEG2 Card	$525.00
Intel Pro/100 Mobile LAN CardBus II RealPort	[illegible]
Intel Pro/100 Mobile LAN CardBus II	[illegible]
Intel Pro/100 LAN+56K Modem CardBus II RP	[illegible]
Intel Pro/100 LAN+56K Modem CardBus II	[illegible]
Kingston EtherX PCMCIA Ethernet Combo	$119.00
Megahertz 3CXFE575BT 10/100 LAN CardBus	$229.00
Megahertz 3CCFE574BT 10/100 LAN	$189.00
Megahertz 3CXE589BET 10BaseT	[illegible]
Megahertz 3CXE589EC 10BaseT/2	[illegible]
Megahertz 3CCM156B 56K Global Modem	[illegible]
Megahertz 3CXM656 56K Cellular Modem	[illegible]
Megahertz 3CXM056 56K Win Modem (XJack)	$219.00
Megahertz 3CCFEM556B 100 LAN+56K Modem	[illegible]
Megahertz 3CXEM556BT 10BaseT+56K Modem	[illegible]
Megahertz 3CXEM556BTC 10BaseT/2+56K Modem	[illegible]
Micro Solutions 24X Backpack Ultra Light CD-ROM	[illegible]
Micro Solutions 24X Backpack CD w/Sound	[illegible]
Micro Solutions 32X Backpack CD-ROM	[illegible]
Micro Solutions 32X Backpack 32X CD w/Sound	[illegible]
Netgear FA411 10/100BaseT Ethernet PCMCIA	[illegible]
New Media Mobile Gamer	[illegible]
Nogatech USB TV Tuner 181 Cable Channels	[illegible]
Nogatech TV Tuner Notebook TV PCMCIA	$325.00
PCMCIA 20x CD-ROM Drive (A/C not required)	[illegible]

Carrying Case

Targus Notepac CN01/CN36	[illegible]
Leather Notebook Case CLN5	$123.00
Platinum Leather Case CPLC1	$229.00
Business Traveler Case CLB8	[illegible]
Business Commuter Case CBC2	[illegible]
[illegible]	[illegible]
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T100,T100 T110,T110,T400 T400 T410 T410, T420,T430, T420,T460 T610, Tecra700 Series	$100/169/NA
Satellite 300, Satellite Pro 400, Tecra 750	$100/133/241
Satellite Pro 440 445, 460, 470, 480	[illegible]/241
Satellite 4090XDVD,2060CDT,2060CDS	$NA/158/278
Portege 7000CT Satellite 4000,4010 Tecra8000	$NA/150/278
Tecra 500, 510, 520, 530 ,550 Portege 600, 660	$NA/[illegible]/NA
IBM-ThinkPad	
ThinkPad 760E/ED/EL/ELD	$84/130/[illegible]
ThinkPad 365X/XD & 380,385	$84/130/[illegible]
ThinkPad 760C/XD/LA/LD	$96/130/NA
ThinkPad 770	$120/226/NA
ThinkPad 770,770E,600E,TP390, i-1451 1511	$60/159/278
ThinkPad [illegible]	$NA/[illegible]/NA
Compaq-Notebook	
Armada 7710-MT 73XX,1610DM,1520DM,1590	[illegible]
Armada 7400 7000 1500C 3000 17XX	[illegible]
Armada 4100 4110, 4120, 4130, 4131,4200T	[illegible]
Armada V,M,E Series	$NA/100/200
Acer-Notebook	
Extensa [illegible]	[illegible]
Extensa [illegible] 710TE, 711TE, 712TE	$NA/147/[illegible]
Extensa Travelmate 380T, 382T	[illegible]

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6GB Hard Drive
Trident Graphics w/2.5MB
12.1" TFT Display
56KBps V.90 Fax Modem
DVD ROM Drive
Built-in Sound System

Model	CPU	RAM	HDD	CD	Display	Price
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2100CDS	K6/400	32MB	4.3GB	24X	12.1 DSTN	$1,675
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3110CT	PII300	64MB	6.4GB		10.4 TFT	$3,32
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4090DVD	Cel400	64MB	6.4GB	DVD	14.1 TFT	$3,20
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4260DVD	P3-450	64MB	12GB	DVD	14.1 TFT	$4,28
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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- 104-keys Keyboard & PS/2 Mouse

PIII-500MHz..$2,395
PIII-550MHz..$2,535
PIII-600MHz..$2,735
PIII-650MHz..$2,885
PIII-700MHz..$3,155

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- On Board GD5480 Video Card 2MB
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- 56Kbps External Fax Modem
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- 104-keys Keyboard & PS/2 Mouse

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PIII-550MHz..$3,055
PIII-600MHz..$3,255
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PIII-700MHz...$2,880

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- Fujitsu 104-keys Keyboard/w MS Mouse

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PIII-600MHz...$6,135
PIII-650MHz...$6,285
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G400	Millennium G400 chip w/32MB Dual Display	$275.00
G400 Max	Millennium G400 Max chip w/32MB Dual Display	$335.00
G400 Marvel	G400 chip 16MB w/Motion JPEG Capture & Editing	$420.00
FireGL1	IBM 256 bit processor w/32MB AGP (SIMD ext.)	$1250.00
Oxygen ACX	Permedia 2 processor with 8MB SGRAM AGP	$158.00
Oxygen VX1	GLINT R3 processor with 32MB SDRAM AGP	$320.00
Oxygen GVX1	GLINT R3 & GLINT Gamma G1 chipset 32MB AGP	$1100.00
Oxygen RPM	3D Labs RPM chipset 64MB Support Dual Screen	$1315.00
Oxygen GMX	Dual GLint GMX 2000 chipset w/96MB AGP	$2495.00
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FE950	19"/18"V 0.25mmDP 1792x1344@68Hz	$740.00
FE1370	22"/20"V 0.24mmDP 2048x1536@80Hz	$1815.00
FP950	19"/18"V 0.25mmDP 1800x1440@73Hz	$870.00
FP1350	22"/20"V 0.25mmDP 1920x1440@78Hz	$1490.00
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GDM-F500	21"/19.8"V 0.22mmDP 1800x1440@80Hz	$2845.00
GDM-W900	24"/22.5"V 0.23mmDP 1920x1200@76Hz	$3300.00

Diamond Scan 70 | 70 17"/16"V 0.28mmDP 1280x1024@66Hz | $470.00
Diamond Scan 90e | 90e 19"/18"V 0.25mmDP 1600x1280@75Hz | $790.00
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		Model	Dot Pitch	Max Res	Viewable	H-Scan	Price
15"	OPTIQUEST	Q51	0.28mm	1024x768	13.7"	30-50KHz	$ 225
	OPTIQUEST	Q55	0.28mm	1280x1024	13.8"	30-70KHz	$ 235
	ViewSonic	E655	0.28mm	1280x1024	13.8"	30-70KHz	$ 258
	ViewSonic	M50	0.27mm	1280x1024	13.8"	30-70KHz	$ 280
17"	OPTIQUEST	Q71	0.27mm	1280x1024	16.0"	30-70KHz	$ 318
	OPTIQUEST	Q73	0.26mm	1280x1024	15.9"	30-70KHz	$ 415
	OPTIQUEST	V75	0.26mm	1600x1280	16.0"	30-85KHz	$ 480
	ViewSonic	E771	0.27mm	1280x1024	16.0"	30-70KHz	$ 330
	ViewSonic	E773	0.25mm	1280x1024	16.0"	30-70KHz	$ 415
	ViewSonic	G773	0.26mm	1280x1024	16.0"	30-70KHz	$ 420
	ViewSonic	GS771	0.27mm	1280x1024	16.0"	30-70KHz	$ 445
	ViewSonic	PS775	0.25mm	1600x1200	16.0"	30-95KHz	$ 515
	ViewSonic	M70	0.27mm	1280x1024	16.0"	30-70KHz	$ 440
	ViewSonic	PF775	0.25mm	1600x1200	16.0"	30-97KHz	$ 600
19"	OPTIQUEST	Q95	0.23mm	1600x1200	18.0"	30-86KHz	$ 530
	ViewSonic	E790	0.26mm	1600x1280	18.0"	30-95KHz	$ 560
	ViewSonic	E790B	0.26mm	1600x1280	18.0"	30-86KHz	$ 625
	ViewSonic	GS790	0.26mm	1600x1280	18.0"	30-86KHz	$ 670
	ViewSonic	PS790	0.25mm	1600x1280	18.0"	30-96KHz	$ 750
	ViewSonic	PF790	0.25mm	1600x1200	18.0"	30-97KHz	$ 730
21"	OPTIQUEST	Q115	0.28mm	1600x1280	19.8"	30-86KHz	$1,065
	ViewSonic	G810	0.25mm	1800x1200	20.0"	30-89KHz	$1,100
	ViewSonic	P810	0.25mm	1800x1200	20.0"	30-95KHz	$1,290
	ViewSonic	P815	0.25mm	1800x1440	20.0"	30-115KHz	$1,355
	ViewSonic	PT813	0.28mm	1600x1200	20.0"	30-107KHz	$1,485
	ViewSonic	P817	0.26mm	2048x1536	20.0"	30-137KHz	$2,210
LCD Panel	OPTIQUEST	L700	0.30mm	1024x768	15.1"	31-61KHz	$1,525
	ViewSonic	VP140	0.30mm	1024x768	14.0"	30-61KHz	$1,320
	ViewSonic	VG150	0.30mm	1024x768	15.0"	30-62KHz	$1,665
	ViewSonic	VPD150	0.30mm	1024x768	15.0"	48-62KHz	$1,665
	ViewSonic	VPA150	0.30mm	1024x768	15.0"	30-62KHz	$1,755
	ViewSonic	VP151	0.30mm	1280x1024	15.0"	30-95KHz	$2,345
	ViewSonic	VP181	0.30mm	1600x1200	18.1"	30-107KHz	$5,000

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Zero-Knowledge offers cloaking software

MONTREAL—Zero-Knowledge Systems (http://www.freedom.net) has released the first widely available version of technology it says can help users remain anonymous on the Net as they surf the Web exchange email or visit online chat rooms

Zero-Knowledge Systems a privately held company headquartered in Montreal has made release 1 0 of its Freedom software available for download on its Web site The software allows users to connect to a global network of Freedom Servers that work to encrypt data they send and receive while at the same time hiding references to the Internet pathways leading back to its users

Zero-Knowledge president Austin Hill said the Freedom Network reroutes its users encrypted data through multiple servers operated by participating ISPs around the world making complete privacy possible for Web browsing email newsgroup reading and Internet relay chat (IRC)

Freedom software users can associate their online activities with one or more pseudonyms—which Zero-Knowledge calls "nyms"—to prevent unwanted collection of information about their real identities including email accounts or the true network addresses of their computers Even Zero-Knowledge is unable to link the nyms" to the people using them the company said

Hill said more than 100 ISPs signed on during an extended beta testing program for the service contributing server horsepower for encryption and routing duties But he said his company has decided to limit the first non-beta release of the client-side Freedom software to 100 000 users to ensure that growth of the Freedom Network is able to keep up with demand from privacy-seeking users

"Essentially we have built an infrastructure that works somewhat like an IP [Internet Protocol] overlay network " Hill said "One of the things we wanted to ensure initially is that we don't get so overloaded with customers on the system that it outpaces our ability to scale the infrastructure

We're very confident about the scaling within the limits we've set " he said We want to make sure our first users—and specifically the beta testers who have worked with us for the last six months to make this real—don't end up having a bad experience "

Also working to test the system were the ISPs who now that the system has gone live will receive revenue based on the volume of Freedom Network traffic they carry and a share of each sale they generate for the US$49 95 client software

"Most of the ISPs we partnered with initially were small to medium ISPs—somewhere in the 20 000-user to 60 000-user range " Hill said

Users who pay US$49 95 for the software can create up to five "nyms" and use them for a year Afterwards Zero-Knowledge plans to charge $10 per year for each additional nym" and for renewals.

A free 30-day trial version of the Freedom software—which can be used with up to three nyms—can be downloaded from the Zero-Knowledge site

—*Newsbytes*

AT&T Canada unveils DSL offering

TORONTO—AT&T Canada (http://www.attcanada.com) has launched its first digital subscriber line (DSL) Internet access offering in Canada and will roll [illegible] service throughout [illegible] work this year

Ron Close president of Internet and E Business Services for AT&T Canada, said the service—using asymmetric digital subscriber line (ADSL) technology—will have the potential to reach 80 percent of business access lines in Canada from some 90 AT&T collocation operations in incumbent telephone-company switching centres AT&T Canada says those centres are connected to its 17 000 km national fiber-optic network.

[illegible] busy equipping the [illegible] to make it DSL ready and that will [illegible] prioritized [illegible] Close said [illegible] Vancouver and Montreal in the [illegible] Calgary Edmonton and Hamilton in the latter part of Q1 Then we'll roll out to other cities thereafter as quickly as we're able to "

Close says customers will be able to connect to the Internet over standard copper telephone lines and receive connectivity of up to 2 2 Mbps down[illegible] up to [illegible] Kbps upstream [illegible] similar to what businesses currently p[illegible] 128 Kbps ISDN lines. Actual throughput can vary he said, "but we've been seeing pretty regularly in excess of T1 speeds [1.5 Mbps] ... and at approximately $485 a month for that sort of speed it really does establish a good price point."

Customers will also receive AT&T Canada support for their own domain name 20 email ➤

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www.s3.com

[illegible] equipment

While Canada's largest incumbent telephone company BCE Inc has been slowly launching DSL access to home users in some parts of the country in which it has operating companies such as Bell Canada in Ontario and Quebec Close said AT&T Canada will cater to businesses for now

"Most of the focus of AT&T Canada has been the business sector" he said "There will be [illegible] for DSL in the [illegible] market once we can bundle different services over that access technology But out of the chute it's an extension of our [business] access network

He said that network also provides high speed connections equivalent to multiple T1 links as well as frame relay and ATM Internet access. "So, we have a full suite of dedicated access products to business now" he said

—*Newsbytes*

Bot does word search in streaming audio

SAN JOSE Calif —Computer company Compaq Corp is showing off its technical prowess with an experimental search engine that can find words in the streaming audio data from some of the Net's online radio shows

Using Compaq's SpeechBot (http://speechbot.research.compaq.com) searchers can uncover say how often the word "angst" has cropped up on recent broadcasts of the Dr Laura Schlessinger show (five times since August) then play the sound bites containing the sought after word

The Houston Tex.-based company took the wraps off SpeechBot at the Streaming Media West show in San Jose Calif in December saying that such technology offers the potential to find nuggets of information in data that is normally out of reach for typical Web search engines

Regular streaming audio productions already being processed with speech-recognition software and indexed by SpeechBot include the Motley Fool Radio Show National Public Radio's Fresh Air and Talk of the Nation, and Art Bell's Dreamland show on the paranormal and space visitors

"Compaq's Corporate Research Laboratories have been pioneers in Internet research " said Bob Iannucci vice-president of corporate research for Compaq With the invention of [Web search engine] AltaVista through its advanced search technologies such as SpeechBot we continue to set the bar for Internet innovation "

The company says SpeechBot and the speech recognition technology it uses were developed by Compaq Corporate Research laboratories in Cambridge Mass and the Gold Coast, Australia

Compaq said SpeechBot's system architecture is highly scalable indexing more than 2 000 hours of audio available for searching on the site The site also shows off Compaq's Professional WorkStations running the Microsoft Windows NT operating system for the multimedia crawling and Compaq ProLiant servers running Linux for the speech recognition

—*Newsbytes*

Lucent unveils wireless Bluetooth

ALLENTOWN Penn —Lucent Technologies (http://www.lucent.com) has taken the wraps off its first Bluetooth-compliant chipset The firm says that the chipset, which will ship in volume during the second quarter of 2000 is fully compatible with the Bluetooth 1 0 specification

Bluetooth is a short-range wireless LAN (local area network) technology designed for use on a wide variety of devices, ranging from mobile phones notebook PCs palmtop devices pagers and even the kitchen toaster The technology supports data transfer rates of up to 2 Mbps and operates at ranges of up to 10 m (32.8 ft) making it perfect for synchronization between disparate devices such as a smart mobile phone or a personal digital assistant (PDA) and a desktop PC

Lucent's chipset consists of a single-chip radio subsystem and a baseband controller complete with protocol software The mid-December announcement came less than two weeks after Lucent became one of the nine promoters of the Bluetooth Special Interest Group (SIG)

The new chipset, the W7020 is a complete low-power Bluetooth radio subsystem in a single component. As part of Lucent's Bluetooth system the W7020 interfaces directly to the W7400 baseband controller and an antenna Designed to operate at a low 2 7 volts and incorporating low power mode features the W7020 is engineered for long battery life At its heart is an integrated radio frequency (RF) transceiver chipset optimized for Bluetooth applications. Unlike conventional RF implementations Lucent says that the W7020 eliminates the need for external RF components.

—*Newsbytes*

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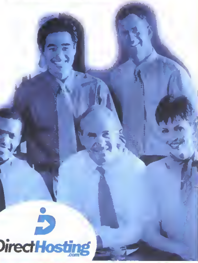

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Continued from page 8

emails obtaining a mail-in rebate offer from the manufacturer or supplier. While the practice of using such rebates seems to be expanding, waiting periods for refunds are becoming more and more protracted. At this moment, I am still awaiting refunds on several items purchased with their rebate coupons mailed as stipulated in early September.

While the individual values are not great, in total they amount to almost $100. Whether I shall ever receive any or all of these, remains an uncertainty.

If manufacturers and suppliers of such materials truly wish to use coupon rebates as a sales incentive, it would seem more practical (and ultimately more cost effective) to allow local vendors to make the redemption at the point of sale. However I am sure they have certain special "marketing" reasons for not doing something so obvious. In any event I now [illegible] all future purchases to stores that are clearly competitively priced at the time of sale.

Max A. Jacobson

Too much junk email

Thankfully I have never faced 1,711 unread email messages (see Last Byte, "You have mail, Darnit!" in *TCP* November 1999). But, like most of us, I receive a flood of messages, many of which are of no interest.

What really bothers me are those sites of potential interest that offer a free newsletter, or future update, by email. Very often those messages are a complete waste of time and turn you off as a potential customer. Even worse, too many post incorrect information about how to remove one's name from the mailing list. For months now I have been trying to get off a list. The simple directions do not work. They must know this as they post a second method, that has not worked either. Contacting the company has, so far, not found anyone to help. Should I have to say that a potential customer has been turned into a raging helpless victim, because of their stupidity.

Brian Newman

Likes new TCP

I like the new look of *The Computer Paper*. I've been reading your paper for about seven years and always look forward to the upcoming edition(s).

I always feel quite fortunate to actually obtain a complimentary copy knowing that there is a high demand and shortage of copies available in and around my area. This is a good indication of the popularity of your paper.

Rommel

Nella Pascal

TCP replies: Thanks to Rommel and others who took the time to give our redesign a thumbs up.

Nella Pascal, who designed The Computer Paper's *new logo, has been working in production on various projects for the publication, including page layouts, poster design, company promotional materials, and more.*

A wife and mother, Nella is very proud of her eight year old son's ability to follow in her graphic design footsteps. Her love of design has won her recognition in the past, but she considers this achievement to be at the top of her list.

Correction

In listing of resources and contacts accompanying the article "From trainspotting to knowledge management" (*TCP* October 1999), an incorrect Web site address was given for the American Productivity and Quality Centre. The correct Web site address for the centre is http://www.apqc.org. ☐

They say it's your birthday

NB—The problem with birthday-reminder services is that you have to already know the date of this important day for your friend or loved one. Instead of asking—again!—check out AnyBirthday.com to see if theirs is one of 130 million names and birth dates that have already been captured in the site's database. If a record doesn't exist, you can manually provide the information for your own reminder. Even if you are not in a gift-giving mood, AnyBirthday.com is still good fun for a purpose its creators may not have intended: looking up the true ages of friends and co-workers. The free site is operated by Louisville, Ohio-based American Automated Systems Inc., which has developed other information Web sites based on public records, including LocateMe.com.

http://www.anybirthday.com

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graphics software the big picture

Graphics: the presentation of information in the form of diagrams and illustrations as opposed to words and numbers.

—Microsoft Encarta World Dictionary

By Rod Lamirand

Graphics software is a broad category of disparate products ranging from inexpensive utilities to highly specialized programs that cost thousands of dollars. The single characteristic tying them together is that are all used to perform a range of functions—create, copy, edit, manipulate organize view, or print—on graphic images.

Graphics software for the personal computer is undergoing a popularization with many easy-to-use but powerful products showing up in stores alongside professional (and expensive) tools.

Two developments in particular have helped drive this growth: evolution of hardware and the expansion of the Internet. Faster computers have made image manipulation easier, less expensive monitors have made it more pleasant, and photo-quality inkjet printers have allowed us to produce dazzling output. If Johann Gutenberg (the man credited with creating moveable type and perfecting the printing press in the mid-1400s) could be brought back to life to see what the average Canadian can do with a computer and printer at home, he'd gape slack jawed with wonder.

Getting images into your computer has also become easier. Prices of flatbed scanners have plummeted in the past couple of years, and improved interfaces have taken scanning from the arcane to the ordinary. As well, the quality of digital cameras improves with each generation. In short, the entire hardware chain involved in capturing, manipulating and printing out images is better, more available, and cheaper than it was just five years ago.

The Internet is the second major factor in arousing new interest in graphics software. Web pages, which are intrinsically visual, are now accessible to many more people and are being used as a medium of expression. When you compare publishing a printed book or magazine with an electronic magazine, the production costs alone vastly favour the latter. An individual of ordinary means can afford to publish online, but would have to be quite wealthy to have the same material printed on paper.

Moreover, print magazines require high resolution images of 200-plus dots per inch (dpi), and expensive software image-editing tools like Adobe Photoshop. With Web publishing lower resolution images are acceptable because they will be viewed on monitors, which have resolutions of 72 or 96 dpi.

Print based graphics concerns like colour matching fidelity issues, preparing colour separations, etc. are simply not part of the Web publishing equation. Although design for the Web still requires an aesthetic sensibility many of the prepress concerns—and the sophisticated tools print artists use to meet them—are simply not an issue.

However, the Web graphic artist has considerable needs related to the uniqueness of the medium, and part of the growth of graphics software has come from software developers creating tools optimized for Web work.

Paint versus draw programs

In general, there are two ways to proceed in creating an image or picture with a computer—bitmap or vector. Bitmap-based programs represent images as a number of points or dots. For example, an image from your digital camera or scanner is a bitmap image. To edit it, software tools blur, colour or otherwise alter these points. Such programs often have the word "paint" or "photo" in their name.

Vector based programs create objects by applying formulas to represent curves, fills etc. CorelDraw is perhaps the best known vector based drawing program for the PC, while Adobe Illustrator has been a favourite for the Mac. (Both are now available on either platform.)

One of the benefits of vector-based graphics is that they can be easily and accurately scaled up—i.e. made bigger. With bitmaps, enlarging the image means enlarging the individual elements. This limits how much bigger a bitmap image can be made, as it will begin to appear blocky or pixellated if made too large.

Of course one of the attractions of bitmap images is their ability to reproduce subtle colour changes from pixel to pixel. Digital photographs are the best example of this. Even the best vector drawings of a human figure look like drawings, not photographs. Interestingly, the growing trend is for graphics software that handle both bitmaps and vectors.

The high end

Graphic professionals use high-end desktop publishing (DTP) products like Quark XPress or Adobe InDesign to create magazines, brochures, pamphlets and the like. For professional bitmap work, like removing wrinkles in a model's dress for the cover of a fashion magazine, Adobe Photoshop, Corel Photo Paint, JASC PaintShop Pro or MetaCreations' Painter would be used. For professional artists interested in creating an image with a vector based program, something with a background 3D text and stylized icons, Adobe Illustrator, Macromedia FreeHand or CorelDraw would the tools of choice.

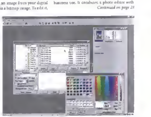
There are many others: Microsoft PhotoDraw and Deneba Canvas for example, are paint style programs that include strong vector tools and try to bridge the two methods.

The home and small office market

As Canadians continue to find a place for computers in their homes—for work, education, creative expression or entertainment purposes—more graphics software is being developed to appeal to this demographic.

Microsoft's graphics software lineup begins with PhotoDraw 2000, which is primarily for business use. It combines a photo editor with

Continued on page 28



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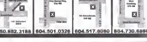

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P-TCP-0100

Graphics software: the big picture

Continued from page 23

strong vector tools, fairly thorough content and a number of templates. Microsoft Picture It! 2000 is its easy-to-use photo editor, which is sold as a standalone product or included in the Microsoft Home Publishing Suite 2000. The suite combines the photo editor with deep content and numerous simplified procedures for creating greeting cards, calendars, Web pages, email and activities for children. Other home graphic products are available from Broderbund, Canon and others.

For specialized business graphics, Corel has a package called Print Office that includes business-related templates, an image editor and a Web page designer. Corel has also released CorelDraw 9.0 Office Edition. It is based on the full version of CorelDraw 9.0, a powerful drawing program, but offers close integration with Corel WordPerfect Office 2000 and Microsoft Office 2000, and includes more than 500 templates for common business graphics like organizational charts and reports. The package also includes Corel's business presentation software, Presentations 9.0, as well as business-related clip art, a flow chart symbol library and an image cataloguing application, Canto Cumulus Desktop LE.

There are also a number of image cataloguing programs available as standalone products. PhotoRecall, from G&A Imaging, for example, will search your hard drive for image files, then allow you to organize them. Yorton Technologies' ShowOff offers similar features.

Web graphics

Almost every graphics program now has some Web features. Generally this means that a program will create images for the Web (i.e., save or export graphics files in GIF, JPEG or PNG formats—the most popular image formats for the Web) or allow for easy creation of Web effects like Java rollovers or image slicing (for tagging various parts of an image with different links).

Often they include an image optimizer which allows you to alter the amount of compression you apply to an image so it will download from a Web site more quickly or allow you to save an image in "Internet safe" colours (colours that reproduce accurately on most Web browsers). Most of them also include a streamlined method (using wizards or templates) for creating Web objects like buttons or background tiles. Some may also include a GIF animator for creating an animated sequence from several still images.

In terms of specific products, Adobe offers ImageReady (which has been incorporated into Photoshop 5.5). Ulead offers Web graphics programs like WebRazor Pro and Java Razor, as well as PhotoImpact 5.0, which is an image editor with an emphasis on Web graphics production. Macromedia FireWorks is geared specifically to creating Web graphics. In December, Macromedia announced Dreamweaver 3 Fireworks 3 Studio, which combines the company's Dreamweaver Web site developer software and Fireworks. And of course, there's Macromedia Flash, the pre-eminent application for creating vector based graphics and animation for the Web.

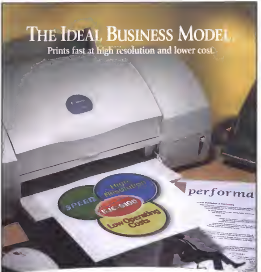
Web multimedia is also starting to gain prominence, but either the media is too fat, or the pipe is too thin to make it anything but a novelty experience. Working at one end of the problem, we see the evolution of technologies like cable modems or DSL, which will help fatten the pipe from our homes to the Internet.

Starting from the other end of the problem, we see the evolution of streaming technologies like Apple QuickTime 4.0 and Microsoft Advanced Streaming Format, and the development of thin formats like MP3 audio. These help deliver a better multimedia signal through an existing thin connection. Eventually, capacity and content will meet, to produce a much better user experience. ❑

Women on the outside

NB—Recreation e-commerce site PlanetOutdoors.com has launched a new wing for active females. WomenOutdoors.com bills itself as the first outdoor site designed by women for women and offers training tips on such activities as cycling, trail running, hiking, climbing and snow sports. WomenOutdoors.com was established by outdoor industry veterans Pamela Bondurant, Nancy Coulter-Parker, Madge Judge and Michelle Theall, founders of the Women's Sports Network (WSPN.net). PlanetOutdoors.com recently acquired the outdoor channel of WSPN, whose contents included gear reviews, sports tips from female Olympians, athlete profiles and general information on sports away from the gym.

http://www.womenoutdoors.com



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- A Open 2B First Mouse w/wheel
- Micromedia M-6100 Sub Woofer
- MS Windows 98 Second Edition (OEM)
- 2 Year Parts & Labour warranty

$2,655

Corporate Edition

$1,750

- ABIT BF6 Pentium II/III 440BX ATX
- INTEL Pentium III 450MHz (Retail)
- Dimm 100Mhz SDRAM 64MB 168pin
- 13.6GB Ultra DMA (66MB/sec)
- 1.44 MB High Density FD
- Creative 52X Int IDE CD-ROM
- Creative AGP Serage 32MB (OEM)
- Aopen PCI FM56-H ITU-T V90 56K Voice Int.
- Creative PCI Ensoniq Audio (OEM)
- D-Link PCI DFE-530TX 10/100 10BT
- Frontier 17" CS-A1 ATX w/250W PS
- Optiquest Q71 17" 27mm Monitor
- IBM Multimedia Internet PS/2 Keyboard
- A Open 2B First Mouse w/wheel (OEM)
- Micromedia M-4100 2 way Speakers
- MS Windows 98 Second Edition (OEM)
- 2 Year Parts & Labour warranty

Spring Festival Edition

- ASUS P2-99 Pentium II/III 440ZX ATX
- INTEL Celeron 433Mhz Socket370
- Dimm 100Mhz SDRAM 64MB 168pin
  6.7GB Ultra DMA 66 Hard Drive
- 1.44 MB High Density FD
- Creative 52X Int IDE CD-ROM
- ATI AGP Xpert 98 8MB (OEM)
- Creative PCI Ensoniq Audio (OEM)
- Aopen PCI FM56-H ITU-T V90 56k Voice Int.
- Frontier 17" CS-A1 ATX w/250W PS
- Samsung 750S 17" 26mm Monitor
- BTC 5140K Win PS/2 Keyboard
- A Open 2B First Mouse+ w/wheel (OEM)
- Adaptor Slot to S370
- PMPO SP631 Stereo Speakers 60W
- MS Windows 98 Second Edition (OEM)
- 2 Year Parts & Labour warranty

$1425

*All prices reflect 2% cash discount
*All prices & spec are subject to change without notice
*All logos and trademarks are their respective owner

[illegible] Multimedia Slim System

- All-in-one Mainboard utilizing the Intel 810 chipset, providing next generation features and great graphics performance at a lower cost
- Support Intel Celeron 300 - 500 MHz Socket 370 CPUs
- Highly Integrated chipset with 3D AGP VGA embedded Motion Compensation circuit inside for smooth DVD title playback
- Provided AV or S-Video output for TV connection with 5.1 channel AC3 support
  56K V9.0 Modem 10/100Mbps Fast Ethernet LAN and dual USB ports for Internet access or external communication
- Book Size 272mmX295mmX82mm

$325

Add on Option Intel CPU

366Mhz – 500Mhz	$65and up
Momery 64MB – 512MB	$109 and up
Hard Drive 4.3GB – 40.0GB	$149 and up

IBM www.pc.ibm.com/ca/netfinity

Model	Part #	Processor	Memory	HDD/Max HDD	Ethernet	Controller	Form	Form
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Model	Part #	Processor	Memory	Ethernet	Controller	Form	Form
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Netfinity Warranty Service
- 3 Years Parts & Labour
- International Warranty
- On Site Warranty all 3 yrs
- Next Day Response Time
- 90-Day Start Up Support
- IBM HelpCenter
- IBM TechConnect
- IBM ServerProven
- Most Connect
- Remote Connect
- Update Connector

IBM Small Business Program

From file and print serving to enterprise resource planning, IBM Netfinity servers are the new generation value-proven foundations for your network computing needs. Netfinity servers deliver power scalability, reliable control and extraordinary service, including Predictive Failure Analysis (PFA), redundant power supply and fast Hot Plug technology.

Netfinity servers also come along with IBM ServerGuide, IBM Netfinity Manager, AntiVirus software and Lotus Domino server package. Options for Netfinity servers can be found at the webpage printed above. For more information feel free to contact the sales department.

Frontier Upgradable Notebook

Model	CPU	Memory	HardDrive	CD-ROM	Screen Size	Modem	Windows	Price
2100P-300	Intel PentiumII 300	[illegible] SDRAM	6.0GB	24Xmax	14.1" TFT	56K V.90	[illegible]	$2970
2100C-400	Intel Celeron 400	[illegible] SDRAM	6.0GB	24Xmax	14.1" TFT	56K V.90	[illegible]	$2715
5100C-366	[illegible] Celeron 366	[illegible] SDRAM	[illegible]	24Xmax	12.1" TFT	56K V.90	[illegible]	$3015

UPGRADE OPTIONS

CPU Celeron 400/433	+ $[illegible]
PentiumII 366/400	+ $[illegible]
Hard Drive 6.0/10GB	+ $[illegible]
Memory 64/64x2/128MB	+ [illegible]

TOSHIBA

Model	CPU	Memory	HardDrive	CD-ROM	Screen Size	Modem	Pr
Satellite [illegible]	Intel Pentium [illegible]	[illegible]	[illegible]	24X CD	12.1" TFT	56K V.90	[illegible]
Satellite [illegible]	Intel Celeron 400	[illegible]	[illegible]	[illegible]	14.1" TFT	[illegible]	[illegible]
TECRA [illegible]	[illegible]	[illegible]	[illegible]	24X CD	[illegible]	[illegible]	[illegible]
TECRA [illegible]	Intel PentiumII [illegible]	[illegible]	[illegible]	[illegible]	14.1" TFT	[illegible]	[illegible]
Tecra [illegible]	Intel PentiumII 400	[illegible]	[illegible]	[illegible]	14.1" TFT	56K	[illegible]

IBM THINKPADS

Model	CPU	Memory	HardDrive	CD-ROM	Screen Size	Modem	Pr
i-series i-14[illegible]	Intel Celeron 433	[illegible]	[illegible]	24Xmax	[illegible]	56K V.90	[illegible]
i-series i-14[illegible]	Intel Celeron 433	[illegible]	[illegible]	[illegible] DVD	[illegible]	56K V.90	[illegible]
i-series i-15[illegible]	[illegible] Celeron 433	[illegible]	[illegible]	[illegible]	[illegible]	56K V.90	[illegible]
[illegible]	[illegible] PentiumII [illegible]	[illegible]	[illegible]	24Xmax	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] PentiumII [illegible]	[illegible]	[illegible]	24Xmax	[illegible]	[illegible]	[illegible]
770Z	Intel PentiumII [illegible]	[illegible]	[illegible]	24Xmax	[illegible]	[illegible]	[illegible]

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Motherboard

Pentium II Motherboard

ASUS P3V4X Pentium III 820 PC133Mhz Rambus AGP ATX	$300
ASUS P3C2000 Pentium III 820 PC133Mhz SDRAM AGP ATX	$279
ASUS P3W / P3W-E Pentium III 810 Video AGP ATX	$179 / [illegible]
ASUS P2-99 Pentium II/III Celeron, AGP ATX / AT	$140
ASUS P3B-F1/F Pentium II/III 440BX, AGP ATX	$190
ASUS P3C-D Pentium III 820 PC133Mhz, AGP ATX	[illegible]
Abit BF6 Pentium II/III 440BX AGP ATX	$178
Abit [illegible] Celeron Socket 370 AGP ATX	$172
Abit BE6-II Pentium II/III 440BX ATX, Ultra66	$210
Abit BP Dual Socket 370 440BX ATX, Ultra66	$290
[illegible] P6BET-ML PII/PIII,Cel,Video,3DSound,56K/M	$120
[illegible] P6BAT-A+ PII/PIII Cel PC133,3DSound,Ultra DMA66	$120
ASUS P5A(A) /P5AB Super 7 AMD K6-2,(Sound)ATX /AT	$142 / 152 / $130
ASUS P5-99VM Sis530 MicroATX Ultra 66	$142
ASUS P5S-B Sis530 U66 M/B w/AGP/Sound AT	$100
ASUS P5S-VM Pentium All Super 7 Video ATX	$198
ASUS P3B1394 IEEE Link Layer Controller ATX	$[illegible]
ASUS K7M Athlon 6MB Slot	$300

MassStorage

IDE Drive

Maxtor 90871U2 8.7GB / 91366U4 13.6GB Ultra 66 5400	$[illegible] / $[illegible]
Maxtor 91741U 17.2GB / 92049U 20.4GB Drive 66 5400	$[illegible] / $[illegible]
Maxtor 92720U 27.2GB / 93600U 36.0GB Ultra 66 7200	$325/$436
Maxtor 91024U 10.2GB / 91366U 13.6GB 2MB (7200)	$190 /210
Maxtor 92048U 20.2GB / 92732U 27.0GB 2MB (7200)	$/200 / 346
IBM Deskstar [illegible] Ultra ATA (5400)	$[illegible]
IBM Deskstar 9.1GB / 13.5GB Ultra ATA (7200)	$190 /215
IBM Deskstar 22.0GB / 34.0GB Ultra ATA (7200)	$[illegible] / [illegible]
Fujitsu MPC3043 4.3GB Ultra ATA (5400 rpm)	$190
Fujitsu MPC3084 8.4GB Ultra ATA (5400 rpm)	$190
Quantum Fireball CX 3.2GB/ 20.5GB(5400 rpm)	$190 / 290
Quantum Fireball KA 9.1GB /13.2GB(7200 rpm)	$200 / 230
Quantum Fireball KA18.4GB / 27.3GB(7200 rpm)	$ 310 / 375

SCSI Drive

Seagate ST150176LW 50GB Ultra-2W (Cheetah)	$1000
Seagate ST318203LW 18GB Ultra-2W (Cheetah)	$1040
Seagate ST318275LW 18GB Ultra-2W (Barracuda)	$736
DeskJet Atlas IV 9.1GB / Atlas IV 18.2GB U2W (7200rpm)	$306 / [illegible]
DeskJet Atlas IV 9.1GB / Atlas IV 18.2GB U2W (10,000rpm)	$500 / 940
IBM Ultrastar 4.5GB 34560 7,200rpm	$240
IBM Ultrastar 9.1GB 39130 7,200rpm	$[illegible]

CDR / CDRW / Zip Drive

HP SureStore CD Writer Plus 8200i IDE 8R/4W Int w/SW	$305
HP SureStore CD-Writer Plus 8210e 8R/4W USB w/SW	$[illegible]
HP SureStore CD-Writer Plus 8210 SCSI 8R/4W Int w/SW /Ext	$[illegible] / $635
Plextor Writer PX-R820Ti 20R/8X/2X SCSI (Retail)	$[illegible]
Plextor Writer W8432Ti 32R/8X 4X IDE (Retail)	$[illegible]
Yamaha CRW8424S 24R/8X/4RW SCSI Int. (Retail)	$435
Yamaha CRW8424E 24R/8X/4RW IDE Int. (Retail)	$300
Mitsumi 4804TE 24X/4X4X IDE Int (OEM)	$279
Sony CRX120E 24X/4X/4X IDE Int.(OEM)w/ Software	$279
Ricoh 24X/8X 4X IDE Int. (OEM)w software	$279
Zip 100MB Internal IDE (OEM) / Parallel (Retail)	$[illegible] / 190
Zip Drive 250MB IDE (OEM)	$130
Zip Drive 250MB Parallel SCSI or USB (Retail)	$[illegible]
Zip Disks 100MB Single Cartridge / 10 Pack	$14 / 136
Zip Disks 250MB Single Cartridge / 3 Pack	[illegible] / 70
Jaz Drive 2GB SCSI Int. / Ext. (Driver on CD)	$[illegible] / 470
Jaz Disks 1GB / 2GB Cartridge	$109 / 135
Castlewood 2GB Digital Drive IDE / SCSI Int	$[illegible] / $[illegible]
Onstream 50GB Digital Drive SCSI Int	$Call
Onstream 30GB /50GB Digital Media	$36 / Call

Video Cards

Matrox Millennium G400 16MB / 32M (OEM)	$179 / 246
Matrox Millennium G400 16MB / G400 32M Dual Display	$196 / 278
Matrox Millennium G400 Max Dual Display	$334
ATI Rage Fury Max 64MB / Rage Fury 128 32MB	$/[illegible] / 190
ATI Xpert Rage 128 AGP 16MB (OEM)	$1[illegible]
ATI Xpert 98 AGP 8MB / Xpert @Play 98 8MB	$80 / 110
ATI All in Wonder 128 AGP 32MB / 16MB (OEM)	$ [illegible] / 246
Diamond Viper V770 TNT2 32MB(OEM)/(Retail)	$198
Diamond Viper V770 TNT2 32MB Ultra (Retail)	$258
Guillemot Maxi Gamer Xentor 32MB TNT2 Ultra (Retail)	$285
Guillemot Cougar Video Edition 2D/3D (Retail)	$240

Creative AGP 3D Blaster GeForce 32MB (Retail)	$300
Creative AGP 3D Blaster GeForce Pro 32MB (Retail)	$[illegible]
Creative AGP Savage4 32MB (Retail)	$130
Creative Graphic Blaster RIVA TNT2 Value 32MB	$190
Creative Graphic Blaster RIVA TNT2 Ultra 32MB	$[illegible]
ASUS AGP RIVA TNT2 Ultra 32MB w/Glasses (Retail)	$329
ASUS AGP V6600 GeForce 32MB Pure	$345
ASUS AGP V6600 GeForce 32MB Deluxe	$400
3DFx AGP Voodoo III 3000 16MB (Retail)	$190
3DFx AGP Voodoo IV 3500 16MB TVTuner (Retail)	$305

Modem / PCMCIA

3Com-USR [illegible] 56k PCI FaxModem (OEM)	$[illegible]
3Com-USR [illegible] 56k PCI (2977 Hardware) FaxModem (OEM)	$[illegible]
3Com-USR V90 56k PCI (2978 Hardware) Umax FaxModem (OEM)	$[illegible]
3Com-USR V90 56K FaxModem Ext. (Retail)	$190
3Com-USR PCMCIA 3CCM556 56K Modem (Retail)	$[illegible]
3Com-USR PCMCIA 3CCFEM656B 56K + 10/100 Lan	$445
Aopen PCI [illegible] 56k V90 Value Fax modem(Retail)	$[illegible] / 70
Xircom CreditCard (PCMCIA) 56K Modem (Retail)	$190
Xircom RealPort [illegible] Modem (Retail)	$[illegible]

Printer

Brother Laser Jet HL1060 / HL1250 300dpi 10ppm	$[illegible] / [illegible]
Brother Laser Jet HL1240BK 300dpi 10ppm 2MB	$[illegible]
Brother Laser Jet HL1250DK 1200dpi 10ppm 8MB	$[illegible]
Epson DeskJet Stylus 440 720 dpi (Windows Only)	$140
Epson DeskJet Stylus [illegible] / 740 Color 1440 dpi	$190 / 209
Epson Stylus Photo 700 720x720	$306
Epson Stylus [illegible] / 900K	$380 /670
HP DeskJet 610C 610 Umax	$190 230
HP DeskJet 830C /895C Color	$[illegible] /445
HP DeskJet 2000C / 2000CN Professional	$735 / 1795
HP LaserJet 1100 600dpi 8ppm 2MB	$578
HP LaserJet 2100 600dpi 10ppm 4MB	$[illegible]
HP 4000 4MB / 4050N 1200dpi 17ppm 8MB	$1900 / $2190
HP 5000 4MB / 5000N 1200dpi 16ppm 8MB (11x17)	$2240 / $3140
HP 8100 / 8100N 1200dpi 24ppm 16MB (11x17)	$3900 / $4300
Lexmark F11 / Z51 Inkjet 1200 dpi	$140/ 379
Lexmark Optra E310 8ppm Postscript	$550
Lexmark Optra M410 16ppm 4MB USB/Parallel	$[illegible]

Scanner

Umax ASTRA 2000P 1200dpi w/Photo Deluxe	$[illegible]
Umax ASTRA 2000U SinglePass 1200dpi USB	$190
Umax ASTRA 2100 SinglePass 1200dpi USB	$240
Agfa Snapscan 1212 1200dpi Flatbed / USB	$190
Agfa Snapscan 1236 1200dpi Flatbed	$290
Visioneer 6100 600x1000 dpi 36-bit (w/[illegible] Rebate)	$[illegible]
Visioneer 7600 600x1200 dpi 36-bit Parallel	$[illegible]
Visioneer 7600 600x1200 dpi, 36-bit USB	$247

Multimedia

Speakers

Creative Cambridge PPS[illegible] 5.1 Theater speakers	$[illegible]
Creative PC Works Fourpoint surround FPS2000	$[illegible]
Creative PC Works Fourpoint surround FPS1000	$130
Altec Lansing ACS48 PowerCube w/Dolby 5-Sound	$180
Altec Lansing ACS64 8 Speaker w/Subwoofer	$135
Altec Lansing ACS45.2 PowerCube System w/Subwoofer	$100
Altec Lansing ACS44 PowerCube System w/Subwoofer	$79
Micromedia M-[illegible] Multimedia Subwoofer System	$[illegible]
Micromedia M-[illegible] Multimedia Subwoofer System	$[illegible]
Micromedia M-[illegible] 2way Speaker Systems	$[illegible]

Sound Card

SoundBlaster PCI Ensoniq Audio (OEM)	$38
SoundValue PCI 128 Int PnP (OEM)	$[illegible]
SoundBlaster PCI Live Value (OEM)	$78
Sound Blaster Live Platinum (Retail) New	$[illegible]
Aureal Vortex2 Superquad PCI W/4 Spkr,D/Out (OEM)	$79

CD /DVD Drive

Creative 52X CD ROM	$76
Creative PC DVD RAM [illegible] Int (Retail)	$[illegible]
Toshiba XM6502B 40X EIDE Int.	$90
Pioneer DVD 10X DVD (Drive Only) / Slot Load	$140 /180
Toshiba M1302 DVD-8X IDE Int. (Drive Only)	$156
Toshiba XM6402 40X CD-ROM SCSI Int.	$156

Plextor Ultraplex Wide SCSI Int.	$190
[illegible] for CD-ROM [illegible]	$[illegible] / [illegible]

Monitor

Optiquest Q71 17" 1280x1024 .27mm	$325
Optiquest Q95 19" 1280x1024 .23mm (Horizontal)	$[illegible]
ViewSonic E771 17" / E773 .27mm	$300 / $425
Viewsonic PF775 17" .25mm PerfectFlat (New)	$535
Viewsonic PF775 19" .25mm PerfectFlat (New)	$775
ViewSonic VP150 15 inch LCD Monitor	$1090
Sony Multiscan CPD-110GS 15" 1280 x 1024 .25mm	$345
Sony Multiscan CPD-210GS 17" 1280 x 1024 .25mm (Demo)	$390
Sony Multiscan CPD-210GS 17" 1280 x 1024 .25mm	$[illegible]
Sony Multiscan CPD-E200 17" 1600 x 1000 .24mm Flatscreen	$[illegible]
Sony Multiscan CPD-G200 17" 1600 x 1200 .24mm	$710
Sony Multiscan CPD-G400 19" 1600 x 1440 .24mm	$1034
Sony Multiscan GDM-F400 19" 1600 x 1200 .22mm	$1545
Sony Multiscan GDM-F500 21" 1600 x 1440 .22mm	$2835
ADI MicroScan Viewpoint 15" .28mm N.I L.R.	$235
ADI MicroScan 5P+ / 6T56 17" .25mm N.I L.R.	$360 / $540
ADI MicroScan G66 19" .26mm USB	$[illegible]
ADI MicroScan [illegible] 21" .26mm N.I L.R.	$1240
LG 995E 19" 1600 x 1200 .24mm	$[illegible]
LG 795 17" 1600 x 1200 .24mm Flatscreen	$490
Mitsubishi Diamond Plus 71 17" .25mm	$335
Mitsubishi Diamond Pro 900u 19" .25mm FlatScreen	$[illegible]
Mitsubishi Diamond Pro 2000u 21" .25mm	$1795
Mag XJ500T 15" Trinitron 1280 x 1024 .25mm	$249
Mag XJ770T 17" FR Trinitron 1280 x 1024 .25mm	$415
Mag XJ810 19" 1600 x 1200 .22mm	$[illegible]
Mag [illegible] 19" 1600 x 1200 .22mm	$Call
NEC FE700 17" FlatScreen 1280 x 1024 .25mm	$425
Samsung Syncmaster 750S 17" .28 / 750B 17" .28	$299 / 385
Samsung Syncmaster 700P+ 17" 1600 x 1200 .20mm	$[illegible]
Samsung Syncmaster 1000P 21" 1600 x 1200 .25	$1440
Samsung Syncmaster SyncFlat 700IFT 17" .25mm	$[illegible]
Samsung Syncmaster SyncFlat 900IFT 19" .22mm	$750
Samsung LCD 530TFT 15 inch LCD Monitor	$1[illegible]

10/100MB Adapters

3Com Fast Etherlink XL PCI 3C905C 10/100BT (For Desktop)	$78
3Com Fast Etherlink XL PCI 3C905B TX 10/100BT (For Desktop)	$78
3Com Fast Etherlink PCI 3C980 TX 10/100BT(For Server)	$234
D-Link DFE-530TX PCI Fast Ethernet 10/100MB RJ-45	$38
Intel Pro /100+ PILA8460 PCI 10/100MB RJ-45 (OEM)	$78
Intel Pro /100+ PILA8470 PCI 10/100MB RJ-45 Server	$145
Aopen ISA / PCI 10BT and BNC Network Card	$29
Aopen PCI 10/100BT Network Card	$[illegible]

10/100MB Hub

10 BaseT Hub

Aopen 5 Port 10BT Hub	$40
D-Link DE-805TP 8 Port / DE-809TC or 809TC 8 Port Hub	$86 / 78
D-Link DE-812TP 12 Port / DE-816TP 16 Port Hub	$190 / 238
Intel InBusiness Hub SH1175 5-Port / SH1078 8-Port	$ 72 / $[illegible]

100MB or 10/100 MB Dual Speed Hub

3Com OfficeConnect TP400 3C16723 4Port 100Base-TX	$ 190
3Com OfficeConnect TP800 3C16722 8Port 100Base-TX	$ 239
3Com OfficeConnect TP1200 3C16721 12Port 100Base-TX	$ 404
3Com SuperStack II 3C16010 Dual Speed Hub 500 12 Port	$ [illegible]
3Com SuperStack II 3C16011 Dual Speed Hub 500 24 Port	$1310
D-Link DSH-5 5 Port Hub 10/100MB Dual Speed	$190
D-Link DSH-8 8 Port Hub 10/100MB Dual Speed	$235
D-Link DSH-16 16 Port Hub 10/100MB Dual Speed	$[illegible]
LinkSys EtherFast 10/100MB Auto Sensing 5 Port Hub	$145

PCMCIA Cards

3Com/Megahertz PCMCIA 3CXFE575BT 10/100 CardBus	$219
3Com/Megahertz PCMCIA 3CCFEM656B 10/100Lan + V90 Modem	$445
D-Link PCMCIA DE-660CT Ethernet 10MBLan	$[illegible]
D-Link PCMCIA DFE-660TX 56k & Ethernet 10MBLan	$290
Intel Pro/100 Mobile PCMCIA [illegible] 10/100MBLan CardBus	$[illegible]

SCSI Adapters

Adaptec PCI 2940 UW (OEM) in stock	$ 208
Adaptec PCI 2940 U2-W (OEM)	$315
Adaptec PCI 3940 Dual SCSI-II	$CALL
Adaptec PCI ARO-1130 /	$410
Adaptec SlimSCSI APA 1460 1600 PCMCIA to Fast SCSI-II	$245

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Image editing's front five

By Jacques Surveyer

With scanners, clip art and digital cameras becoming more affordable, image editing is no longer the sole domain of the graphic artists. But when you advance beyond the software bundled with your hardware, where do you turn?

While office applications barely test the powers of Apple G4 and Pentium III processors, even 2D graphics programs like Adobe Photoshop and Corel Photo-Paint push these workstations to their limits, especially when handling large, multi-megabyte high resolution photographic images. Of course creating 3D images or video editing makes even more demands on even the most advanced desktop computers—but that's a subject for a different article.

In this review we return to the heart of computer graphics and examine five of the leading photo manipulation software packages that are available to personal computer users. The software covered in this roundup is a distinct rung above applications like Adobe Photo Deluxe, Corel Print House, and dozens of other photo manipulation programs that focus on ease of use rather than raw manipulation power. Sure you can crop photos and perform simple colour corrections and retouching with the user friendly programs, but the five powerhouses covered here have several features that set them apart.

Perhaps the most important is the ability to open, manipulate and store your images with the highest fidelity. This involves using the best possible storage mode—be it RGB or CMYK, at 24, 32 or 48 bits. It also means using lossless file formats or compressed formats in which you can decide the amount of compression (and therefore the amount of image degradation) you are willing to tolerate. Finally, with the inclusion of ICC (International Colour Consortium) or other professional colour profiles, these programs can guarantee the accuracy of reproduction of on-screen, stored and printed images.

Our roundup includes Adobe Photoshop 5.5, Corel Photo-Paint 9.0, JASC PaintShop Pro 6.0, MetaCreations Painter 6.0 and Microsoft PhotoDraw 2.0. We'll also throw in a brief discussion of some outstanding Adobe plugins, such as Extensis MaskPro and RightHemisphere DeepPaint. Although many of these programs have a core of common features, each was selected for its distinctive competencies and capabilities, which we highlight in our evaluation and three favourite features lists.

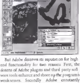
In addition with the "out of box" evaluation we emphasize the immediate experiences of using each program and how easy they are to get up and running to begin creating. Without further delay, we'll let the programs illustrate some of their finer points.

Adobe Photoshop 5.5
From: Adobe Systems Corp.
Tel: 800-833-6687 http://www.adobe.com
Street price: $787 $264 (upgrade)

Overview: Adobe Photoshop is the most technically sophisticated of the photo manipulation programs in no small part due to a huge number of Adobe's own and third-party plugins.
Pros: Has some of the most sophisticated layering, path and transparency controls in image processing programs.
Cons: Both brush tools and ease of use need support from third-party plugins in order to come up to graphics standards.
Out of box: Easy to install but a complex interface means a major learning curve that is aided only by a very solid manual and help files.

Adobe Photoshop is the Jekyll and Hyde of graphics programs. On one hand it has been not only the leading graphics tool but also one of the pioneers (along with Micrografx Picture Publisher) in establishing the basic functionality of photo manipulation software. Photoshop also tops the field in technical feats for layering and path actions.

On the Hyde side, however, Photoshop can be cumbersome to learn and relies on third party plugins to come up to industry standard functionality in such areas as brushes and ease of use. Such a rich program stumbling on such mundane features is hard to get used to.



But Adobe deserves its reputation for high end functionality for two reasons. First, the dozens of Adobe plugins and third party software tools enhance and shore up the program's weaknesses. Secondly, Adobe constantly improves its toolset. Take the range and ease of use of Photoshop's masking tools. With Photoshop 5.5 Adobe has enhanced considerably the already improved masking capabilities of Photoshop 5.0.

The new Extract command allows the user to outline an object to be masked with familiar paint tools. Then Photoshop extracts the image with uncanny accuracy. It is also very easy to repeat and refine the mask if you think it needs some fine tuning. Thus in short order, Photoshop has moved from just average masking features to some of the best (although Extensis' Mask Pro plugin certainly makes masking chores in Photoshop a lot easier).

In the case of brushes, Photoshop still needs help from the likes of RightHemisphere whose DeepPaint plug in allows users to do a lot more brush types, effects and tuning. Photoshop allows users to create their own brushes with shape, size, spacing, hardness, angle and roundness. To those DeepPaint adds brush profile, pressure, canvas, mixing, smudge and several other stroke behaviours. The result is that Photoshop users can achieve many natural (and unnatural) painterly effects that were previously the exclusive domain of Metacreation's Paint program.

Photoshop provides colour correction, brush, masking and layering tools that allow graphic designers to extract, compose and blend images together, add text and create vector drawings in remarkable "imagine-that" ways. Thus, with Photoshop it was hard to narrow down our favourites to the following three features.

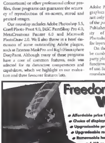
1. Tabbed dialogues containing several settings (e.g., colour, swatches, brushes) that roll up to title bar in a compact form.
2. The new Extract masking dialogue is a keeper for its ability to simplify tough image isolation/knockout tasks.
3. ICC profiles allow accurate reproduction of colours across a wide range of printers, monitors, and other devices.

In summary, Photoshop and Corel's Photo-Paint duke it out for top-end features, with Adobe taking the lead with technical innovations, while Photo Paint provides more intuitive and easy to use capabilities. Photoshop currently provides better reach—the latest version is available for Mac and Windows platforms—and better professional printing and colour control. However, even the street price is high and more ease of use aids (better preview options, faster and more help hints, a "what's this" pointer tool, built-in tutorials and coaches, and more adjustable settings) are needed to make the interface less intimidating and to lower the arc of the learning curve.
Overall rating: 4.5 out of 5

Corel Photo-Paint 9.0
From: Corel Corp.
Tel: 613-728-8200 http://www.corel.com
Street price: $406 $119 (upgrade)

Overview: Corel Photo-Paint is the premier photo-

Continued on page 45



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2MB Flash ROM on board, provides complete Advanced Configuration Power Interface (ACPI) and Legacy PMU Ultra DMA 66, fully compliant with PC97 and PC98
Provides ATX power connector supports various functions of ATX power such as
Suspend, Shutdown, Wake on LAN, Wake on modem, Wake on Alarm, Interrupt
Wake up from keyboard/ mouse and Keyboard Power On/OFF
Supports PC98 Color connector for easy identification of peripheral devices.
Provides Trend Micro's ChipAway Virus and PC-Cillin98 (OEM) for Windows
95/98 and Internet virus protection.

Intel Celeron 433/466/500/533mhz(w/o fan)........................ $253/ 288/ 356/ 423
Intel Pentium 500/550/ 600Mhz. $468/ 548/ 678
Intel Pentium 533/ 667/ 733mhz........................... $508/ 898/ 1148
Intel Pentium 650/700/750Mhz .... $858 / 1088 / 1398

$188 bareboard

M763MRT

Intel i810 AGP chipset

Celeron 266-500MHz at 66/100MHz Micro AT Format
Support with Slot 1 and Socket 370 Processors for flexible CPU selection
Provides 2x DIMMs for SDRAM memory up to 512MB
Audio supports MS Direct 3D and Aureal's A3D interface, w/ 4
Digital Audio Interface (SPDIF) IN/OUT with 24-bit Stereo,
Bundled Gamut includes MP3 Encoder/ Decoder
Intel 810 chipset, Dynamic Video Memory Technology, up to
1600 x 1000 at 8-bit colour at 85HZ Refresh
PC98 Colour Connector for easy identification of peripheral devices
56K Fax/Modem on board, bundled Super Voice for Fax/Modem
and Voice applications; MediaRing Talk for Internet Phone Communications
Built-in 10 Base T/100 Base TX LAN
and ANSI X3212 TP PMD standards

Intel Celeron 433/466/500/533mhz(w/o fan)........ $223/ 258/ 326/ 393
Intel Pentium III 500/550/600Mhz......... ...... $438/ 518/ 648
Intel Pentium III 650/700/750Mhz.. .... $828 / 1058 / 1368

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HT-0100

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2

[illegible]

- Intel Celeron 400MHz CPU
- Elite P6SET-ML SiS630 Slot 1/Socket 370 Motherboard
- 64MB 168Pin 100MHz SDRAM
- 1.44MB 3 1/2" Panasonic Floppy Drive
- 6.4GB IDE-ATA66 5400RPM/9ms/2MB Hard Drive
- ATI 8MB Rage PRO 3D AGP Video
- 18" AT/ATX Tower Case/250W Power Supply
- 104 Win'98 P/S2 Keyboard
- 2B Mouse P/S2
- 48K V.90 Integrated Voice/Fax Modem
- 16Bit 3D Sound w/Wavetable
- 48X IDE CD-ROM Drive
- 120W Stereo Speaker
- One Month Internet Free
- Full warranty

$666

NEC TOSHIBA HEWLETT PACKARD

CPU

Intel Celeron 400MHz CPU	$109.00	Intel Pentium III 600MHz CPU	$658.00	AMD K7 Athlon 550MHz CPU	$449.00
Intel Celeron 466MHz CPU	$158.00	AMD K6II 3D 400MHz CPU	$75.00	AMD K7 Athlon 600MHz CPU	$686.00
Intel Pentium III 500EMHz CPU	$379.00	AMD K6II 3D 450MHz CPU	$99.00	AMD K7 Athlon 700MHz CPU	$1,088.00
Intel Pentium III 500MHz CPU	$399.00	AMD K6III 3D 400MHz CPU	$159.00		
Intel Pentium III 600B CPU	$149.00	AMD K6III 3D 450MHz CPU	$236.00		

Motherboard

Hard Drive (IDE)

IBM 12.9GB U-IDE 7200RPM	$290.00	Fujitsu 10.2GB IDE ATA66 5400rpm/10ms/256K	$158.00	Maxtor 20.0GB [illegible] 7200rpm/9ms/516K	$266.00
Quantum 13.6GB Fireball KA U-IDE 7200RPM	$230.00	Fujitsu 17.0GB IDE-ATA66 5400rpm/10ms/512K	$209.00	Maxtor 20.0GB IDE-ATA66 5400rpm/9ms/2MB	$284.00
Quantum 27.3GB Fireball KX U-IDE 7200RPM	$378.00	Fujitsu 8.4GB IDE ATA66 5400rpm/10ms/256K	$149.00	Maxtor 27.0GB IDE ATA66 7200rpm/9ms/2MB	$349.00
Quantum 9.1GB Fireball KA U-IDE 7200RPM	$218.00	Fujitsu 8.4GB IDE ATA66 5400rpm/10ms/256K	$165.00	WD 13.6GB IDE-ATA66 7200 [illegible]	$266.00
Samsung 8.4GB U-IDE	$163.00	Maxtor 17.4GB IDE ATA66 5400rpm/9.5ms/512K	$219.00		

Sound Card

SoundBlaster AWE PCI 128 Sound Card	$48.00
SoundBlaster Ensoniq PCI Sound Card	$30.00
SoundBlaster Live Sound Card X-GAME	$139.00
SoundBlaster Live Value Sound Card	$76.00
1868 ESS 1868 Chipset Sound Card	$16.00

CD ROM Drive

Creative Labs 52x CD-ROM Drive	$75.00
Toshiba 40x IDE CD-ROM Drive	$89.00
Toshiba 40x SCSI CD-ROM Drive	$139.00
Aleary 50x IDE CD-ROM Drive	$63.00
Delta 48x IDE CD-ROM Drive	$65.00
Acer 50x U-DMA IDE CD ROM Drive	$69.00

CD Write

Creative Laser 6434 CD-RW Drive	$368.00	Yamaha CRW4416S Int. SCSI
Aaper 6X4X24 CD-W Drive	$269.00	Yamaha CRW8424 E-IDE INT
Ricoh 6X4X24 CD-W Drive	$269.00	Mitsumi 4x/2x/8x Int. IDE CDRW
		HP 8210 Int. IDE CD-ReWriter D
		HP 8210 (8x4x32) CD-ReWriter

Printer

Brother HL 1060 LaserJet Printer	$378.00	EPSON 860 InkJet Color Printer	$269.00	Samsung [illegible] Laser Printer	[illegible]
Brother HL 1040DX LaserJet Printer	$426.00	EPSON 740 InkJet Color Printer	$309.00	Xerox 480C Printer	$864.00
Brother MPC-1970 LaserJet Printer	$378.00	Lexmark 3200 InkJet Color Printer	$229.00	HP 1100 Laser Printer	$848.00
Canon BJC-2000SE InkJet Color Printer	$145.00	Lexmark Z11 InkJet Color Printer	$148.00	HP 2100 Laser Printer	$968.00
Canon BJC-5100 InkJet Color Printer	$229.00	Okidata 8W Printer	$389.00	HP 830C DeskJet Printer	$299.00

Scanner

- Canon FB630P Color S
- Epson 1200 U Perfection
- MicroTek Scanner X6 /

Speakers

Speakers Juster 3D-108 Subwoofer / 3D Sound	$55.00
Speakers ROCK, LIVE, 270A Subwoofer Stereo	$85.00
Speakers Yamaha MS20 W/SubWoofer	$89.00
Speakers Altec Lansing ACS54w	$98.00
Speakers Cambridge PC Works 4-Point Surround Kit	$139.00

Network Card

3COM 3C905B-TX PCI 10/100 Base Networking Card	$75.00
SVC Ethernet PCI Combo Network Card	$38.00
Intel EtherXpress Pro 100 Plus PCI Network Card	$83.00
Acer Ethernet Combo ISA PnP 10Mbps Card	$28.00
Acer Ethernet Combo PCI PnP 10Mbps Card	$28.00
D-Link DFE-530TX 10/100Base PCI RJ45 Network Card	$36.00

Fax / Modem

- Supra 56K V90 Fax/Modem Card
- USR 128K Internal ISDN Fax/Modem
- USR 56K V90 Internal Voice/Fax Modem
- USR 56K V90 Internal Voice/Fax Modem (w
- Acer (AOpen) 56K V.90 Int Voice/Fax Modem
- Acer (AOpen) 56K V.90 Int Voice/Fax Modem

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RUBY SYSTEM

- Intel Pentium III 500MHz CPU
- ASUS P3B-F1 Pentium III Motherboard ATX
- 64MB 168Pin 100MHz SDRAM
- 1.44MB 3 1/2" Panasonic Floppy Drive
- 13.6GB IDE-ATA66
  5400RPM/9ms/2MB Hard Drive
- ATI 8MB SRAM Xpert99 AGP Video Card
- 18" AT/ATX Tower Case/200W Power Supply
- 104 Win'98 P/S2 Keyboard
- 3B Mouse P/S2
- 56K V.90 Int. Voice Fax/Modem/PCI
- 50X IDE CD-ROM Drive
- SoundBlaster Live Value Sound Card
- Jester 3D-104 Subwoofer / 3D Sound
- LG Electronic 8X DVD
- One Month Internet Free
- Full warranty

17" Optiquest Q71 Color Monitor Included

$1688

EMERALD SYSTEM

- AMD K7 Athlon 500MHz CPU
- ASUS K7M Motherboard
- 64MB 168Pin 100MHz SDRAM
- 1.44MB 3 1/2" Panasonic Floppy Drive
- 17.9GB IDE-ATA66
  5400rpm/10ms/512k Hard Drive
- 32MB Riva TNT2 AGP Video Card
- 17" ATX A500 Tower Case/230W Power Supply
- MS Natural Elite P/S2 Keyboard
- MS Intelligent Mouse
- USR 56K V.90 Int. Voice/Fax Modem Card(win)
- SoundBlaster Live Value Sound Card
- Speakers Altec Lansing ACS64m
- 10X DVD Int. IDE Drive
- One Month Internet Free
- Full warranty

19" SVGA Color Monitor Included

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DIAMOND SYSTEM

- AMD K7 Athlon 700MHz CPU
- ASUS K7M Motherboard
- 64MB 168Pin 100MHz SDRAM
- 1.44MB 3 1/2" Panasonic Floppy Drive
- 13.6GB IDE-ATA66
  7200RPM/9ms/2MB Hard Drive
- 3Dfx Voodoo3 3000 AGP 16MB Video Card
- 18" AT/ATX Tower Case/250W Power Supply
- 104 Win'98 AT Keyboard
- 3B Mouse P/S2
- 56K V.90 Int. Voice Fax/Modem/PCI
- SoundBlaster Live Value Sound Card
- 52X CD ROM Drive
- Jester 3D-104 Subwoofer / 3D Sound
- One Month Internet Free
- Full Warranty

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[illegible] Motherboard	$199.00	[illegible] Motherboard	$119.00	[illegible]	$148.00
[illegible] A Socket 7 Motherboard	$179.00	[illegible] Motherboard	$149.00	[illegible] Chipset [illegible] Motherboard [illegible]	$115.00
GA-5AX [illegible]	$198.00	[illegible]	$196.00		

Drive [illegible]

[illegible]	[illegible]
[illegible]	$410.00
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[illegible]	$726.00

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ATI 32MB Fury Rage128 AGP2X PC2TV Video Card	$166.00	3Dfx Voodoo3 3000 AGP 16MB Video Card	$189.00
ATI 32MB SRAM Xpert2000 Video Card	$166.00	Oxygen VX1 Video Card	$339.00
ATI 8MB SRAM Xpert99 AGP Video Card	$109.00	Pine SIS 3D 8MB PCI Video Card	$39.00
Creative 32MB Riva TNT2 AGP Video Card	$149.00	Pine SIS 3D 8MB AGP Video Card	$56.00
Creative Savage 4 32MB AGP Video Card	$149.00	ASUS 32MB AGP V6800 Video Card	$386.00

[illegible] Drive	$386.00
[illegible]24 CDRW	$386.00
[illegible]	$289.00
[illegible]	$299.00
[illegible]	$399.00

Monitor

MAG [illegible]	$389.00	[illegible]	$318.00	[illegible]	[illegible]
NEC 17[illegible]	$399.00	[illegible]	$399.00	Optiquest [illegible]	$316.00
SONY 15[illegible] Color Monitor	$319.00	[illegible]	$1,286.00	Optiquest 19[illegible] Color Monitor	$566.00
SONY 17[illegible] Color Monitor	$489.00	[illegible]	$189.00	Azura 17" [illegible] Color Monitor	$269.00
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		[illegible]	$249.00
[illegible]	$199.00	[illegible]	$136.00
[illegible]	$366.00	[illegible]	$269.00
[illegible]	$209.00	AGFA 1212U Scanner	$899.00

Hub Repeate

		OEM 8Port Networking Hub 10 Base Stackable	$85.00
3COM Superstack10/100 BaseT 16Port HUB	$466.00	Acer 8 Port Coax/10Base Hub	$56.00
Intel Express 100 Base T 12Port HUB	$1,100.00	D-Link 12Port 10Base Hub	$199.00
OEM 5Port Networking Hub 10 Base Stackable	$49.00	D-Link 8Port 10Base Hub w/UpLink Port	$106.00

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[illegible]	$266.00
[illegible]	$116.00
[illegible]	$56.00
[illegible]	$39.00
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		[illegible]	$2,633	**DVD** [illegible]	[illegible]
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Compaq M300 C[illegible]	$2,796	[illegible] MB/14	$4,569	[illegible]	[illegible]
Compaq Pres[illegible]	$3,096	[illegible]	$2,249	[illegible]	[illegible]
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- 32MB PC100 SDRAM
- 8.4GB UDMA66 hard drive
- 3.5" 1.44MB floppy disk drive
- 64Bit AGP 8M 3D Video Accelerator supporting full screen MPEG
- 15" ATX Mini tower case 230W
- 2B Mini Mouse & Pad
- 104 Win98 Keyboard
- 36X UDMA CD-ROM Drive
- 100W Multimedia Speakers
- 56K V.90 Voice/FAX Modem
- 10/100 Mbps NetCard (@HOME /ADSL Ready)
- 2 Years Parts and 3 year Labour Warranty

(Monitor Extra) **$579**

HOME ENTERTAINMENT

INTEL CELERON 500 MMX

- Microstar 6163Pro 440BX,USB,128K
- 64MB PC100 SDRAM 128K,
- Maxtor 13.6GB UDMA33 Hard Drive
- 3.5" 1.44MB Floppy Disk Drive
- Sniper2 TNT2 M64 32MB AGP W/DVD SW TV OUT
- 15" Monitor R.I.L.R. Digital Control 1280x1024, .28 dp. PnP
- 18" Med Tower case ATX 250W CSA
- Microsoft 3B IntelliMouse
- 104 Windows 95/98 Keyboard
- Pioneer 10X DVD-ROM Drive
- Acer AW37 3D SW Wavetable ISA
- Jester 3D-FX1 450W /Subwoofer & Mic
- Motorola 56K PCI Voice/FAX Modem
- 2 Years Parts and 3 year Labour Warranty

$1366

UPGRADE PACKAGES

INTEL CELERON 366A MMX PII 440BXPro ATX, 32MB PC100,15" ATX Tower, 8GP Video, 3D Sound, 56K Modem, NetCard	$318
INTEL PENTIUM II 400 MMX PII 440BXPro ATX,32MB PC100, 15" ATX Tower, 8GP Video, 3D Sound, 56K Modem, Netcard	$453
AMD K6-2 3D 400 w/ 3D Now! Super 7 100MHZ Sound, 32MB PC100 15" ATX Tower, 58 3D AGP 4MB	$325

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30 Days Internet	FREE!
Windows98 SE Full Version	$138
WindowsNT Workstation 4.0	$276
MS Home Bundle	$88
Corel/Wordperfect Office 2000	$44.95
Corel/Wordperfect Suite 7	$5.95
DVD Software	$15
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INTEL PENTIUM III 450 MMX

- Microstar 6163Pro 440BX, USB, 512K
- 64MB PC100 SDRAM,
- Maxtor 13.6GB UDMA63 Hard Drive
- 3.5" 1.44MB Floppy Disk Drive
- Creative 3D Blaster SAVAGE 4 32MB AGP
- VIEWSONIC E771 17" Monitor N.I.L.R, OSD 1280x1024, .27 DPI, PnP
- 18" Med-Tower case ATX 250W CSA
- Logitech 2B NetMouse w/scroll
- 104 Windows 98 Keyboard
- Acer 48X UDMA CD-ROM Drive
- Acer AW236 PCI Crystal 3D Sound
- Acer PCI 56K V.90 Voice/Fax Int.
- Jester 3D TX1 450W /Subwoofer & Mic
- 56K PCI Voice/FAX Modem V.90 Ready
- 2 Years Parts and 3 year Labour Warranty

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INTEL CELERON 433 MMX

- Houston M741SLMRT ATX w/Video (Shared 8MB), Sound, 56k & NIC
- 64MB PC100 SDRAM
- Quantum 10.2GB UDMA Hard Drive
- 3.5" 1.44MB floppy disk drive
- 17" Tytron Monitor R.I.L.R 1280x1024, .28 dpi
- 15" ATX Tower Case 250W
- Logitech Netmouse w/Scroll & Pad Internet Keyboard
- Sony 8X/32X DVD-ROM Drive
- Roch Live 2000 Speaker System w/ Subwoofer
- 56K V.90 Voice/FAX Modem
- Lexmark 211 Printer & Artec 1236P Scanner
- Windows 98SE full ver w/CD & Manual
- 2 Years Parts and 3 year Labour Warranty

$1550

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AMD K6-III 400 MMX

- Microstar MS5168 ALI ATX 512k , USB, 512K
- 32MB PC100 SDRAM
- Maxtor 8.7GB UDMA66 Hard Drive
- 3.5" 1.44MB Floppy Disk Drive
- Diamond Speedstar A50 8MB AGP TV OUT
- 15" Monitor R.I.L.R, Digital Control 1280x1024, .28 dp, PnP
- 17" Med Tower case ATX 250W CSA
- Logitech 2B PS/2 Mouse
- 104 Windows 98 Keyboard
- 50X UDMA CD-ROM Drive
- Acer AW37 3D SW Wavetable ISA
- 100W Multimedia Speakers
- Motorola 56K PCI Voice/FAX Modem
- 2 Years Parts and 3 year Labour Warranty

$968

GAME BUSTER

INTEL PENTIUM III 450 MMX

- Microstar 6163Pro 440BX, USB, 512K
- 64MB PC100 SGRAM
- Maxtor 13.6GB UDMA66 Hard Drive
- 3.5" 1.44MB Floppy Disk Drive
- 3DTX Voodoo3 3000 16MB w/ TV Out
- Optiquest V95 19" Monitor .26dpi 1600x1200
- 17" Med-Tower case ATX 250W CSA
- Logitech 2B NetMouse PS/2
- 104 Windows 98 Keyboard
- Acer 50X UltraDMA CD-ROM Drive
- Aureal Vortex2 SuperQuad (Digital I/O) A3D 2.0
- Jester 3D TX1 400W /Subwoofer & Mic
- Motorola 56K PCI Voice/FAX Modem
- 2 Years Parts and 3 year Labour Warranty

$1889

AOPEN PIII-450 TNT2

INTEL PENTIUM III 450 MMX

- AOpen AX6BC PII/III 440BX,USB, 512K
- 64MB PC100 7ns SGRAM
- IBM 13.6GB UDMA66 512K 7200RPM Hard Drive
- 3.5" 1.44MB Floppy Disk Drive
- Diamond Viper770 RivaTNT2 AGP 32MB 2D/3D
- ViewSonic E771 .27 1280X1024 OSD PnP
- AOpen 17" Med-Tower case ATX 230W CSA
- AOpen 2B PS/2 NetMouse
- AOpen Spill resistant PS/2 WIN98 Keyboard
- AOpen 50X UDMA CD-ROM
- Acer AW37 3D Wavetable 64 Voice Sound
- Jester 3D TX1 450W /Subwoofer & Mic
- Acer 56K PCI Voice/FAX Modem V.90 Ready
- 2 Years Parts and 3 year Labour Warranty

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WORKGROUP SERVER

INTEL PENTIUM III 500 MMX

- ASUS P3B-F 440BX USB 512k
- 128MB PC100 SDRAM
- Quantum 20GB UDMA33 Hard Drive
- 3.5" 1.44MB Floppy Disk Drive
- S3 Trio3D 4MB AGP 128bit
- 18" Med-Tower case ATX 250W CSA
- Logitech 2B PS/2 Mouse
- 104 Windows 98 Keyboard
- 50X UDMA CD-ROM Drive
- 64 Voices Full Duplex 3D Sound Card
- 160W Multimedia Speakers & MIC
- 3COM PCI 3C-905 10/100Mbs Netcard
- 2 Years Parts and 3 year Labour Warranty

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AMD ATHLON 500MHZ SLOT A
OEM W/FAN
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2.
ASUS K7M ATHLON MOTHERBOARD
$247.72

3.
ASUS V6600 DELUXE GEFORCE 256 AGP
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$407

4.
SOUNDBLASTER LIVE V2.0 VALUE
OEM W/ DIGITAL OUT
$85

5.
ALTEC LANSING ACS54
3 PIECE
$115

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HEWLETT PACKARD DESKJET 810C
600DPI COLOR
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9.
SONY CRX140S CDRW 8X/4X/32X
SCSI INTERNAL
$376.25

10.
CREATIVE LABS ANNIHILATOR PRO
$420.14

RAM

MEMORY TYPE	4MB	8MB	16MB	32MB	64MB	128MB	256MB
Regular 30-Pin	[illegible]						
[illegible] 72-Pin	[illegible]	[illegible]	[illegible]	[illegible]			
EDO 72-Pin	$30	$50	$80	$170			
[illegible]			[illegible]	[illegible]	[illegible]		
PC100 SDRAM 168-Pin			$40	$130	$210	$430	
[illegible]				[illegible]	[illegible]		
Generic PC133				$150	$300		
[illegible]				[illegible]	[illegible]		

CPU

MHz	350	400	450	433	466	500	550	600	650
Celeron [illegible]	$100	$120	$130		[illegible]				
Pentium III [illegible] Retail					$300	[illegible]	[illegible]	$640	
AMD K6-2 [illegible]		$110			$230				

MOTHER

ABIT BE6 / BX133-500MHz / PC100 6ISA / ATA-2 / BH6	$158 / 180 / 164
ASUS P3B-F / 133-500MHz / PC100 P3B-F / P2B-DS	$183 / 600
ASUS P2B-LS [illegible]	$614
ASUS P5A-B SUPER7 AT W/ [illegible]	$130
INTEL [illegible] CEL/PPGA ATX W/ SOUND & VIDEO	$398
[illegible] ATX [illegible]	$138 / 230 / 138
MICROSTAR MS-6306 SUPER 7 ALI ATX 512K W/ USB	$117
Shuttle [illegible] Super / VIA Chipset 512K AT	$100

REMO

SEAGATE Seagate Unix DAT 24GB Ext	$1,340
IOMEGA ZIP Parallel / USB	$148 / 180
IOMEGA ZIP 250MB IDE / Parallel / SCSI EXT / USB	$238 / 282 / 245 / 252
CASTLEWOOD ORB 2.2GB Disk *NEW!*	$62

HARD

Fujitsu	4.3GB	8.5ms	5400	512K	UDMA66	$140
Fujitsu	8.4GB	9ms	5400	256K	UDMA33	$168
Fujitsu	17.3	9ms	5400	512K	UDMA66	$270
Western Digital	6.4GB	9.5ms	5400	2MB	UDMA66	$180
Western Digital	13GB	9.5ms	5400	2MB	UDMA66	$185
Western Digital	20.4GB	9ms	5400	2MB	UDMA66	$280
Quantum	10.2GB	9ms	5400	512K	CX UDMA66	$180
Quantum	20GB	9ms	5400	512K	CX UDMA66	$280
Quantum	18.2GB	8.5ms	7200	512K	[illegible] UDMA66	$321
IBM	12.5GB	9ms	7200	512K	UDMA66	$220
IBM	34GB	9ms	7200	2MB	UDMA66	$504
Maxtor	8.7GB	9ms	5400	512K	UDMA66	$180
Maxtor	13.6GB	9ms	7200	2MB	UDMA66	$240
Maxtor	17.2GB	9ms	7200	2MB	UDMA66	$271
Maxtor	27.3GB	9ms	5400	2MB	UDMA66	$329
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Seagate U2W	50GB	8ms	7200	512K	Barracuda	$1840
Seagate	9.1GB	8ms	10000	1MB	Cheetah	$1440

MULTIM

CD-ROM & DVD DRIVE

CREATIVE LABS 52X CD-ROM	$96
[illegible]	[illegible]
TOSHIBA 36X IDE / 48X IDE / 48X SCSI	$73 / 83 / 148
[illegible]	[illegible]
DVD 6X IDE Bare Drive TOSHIBA / SONY	$130 / 128
[illegible]	[illegible]
DVD 8X IDE Bare Drive PANASONIC / HITACHI	$129 / 133
[illegible] PC-DVD 6X [illegible]	$604

SOUNDCARD

CREATIVE SoundBlaster 16PnP / Ensoniq PCI	$46 / 40
[illegible]	[illegible]
CREATIVE Sound Blaster Live Platinum / X-Gamer / MP3+	$287 / 141 / 148
[illegible]	[illegible]
DIAMOND Monster Sound MX300 / Aureal Vortex2 SuperQuad	$116 / 72
LG MP3 Player 32MB	$207

CD-RW

RICOH 8x / 4x / 24x Int. IDE w/ Software [illegible]	$290
CREATIVE 4424 Retail	$330
YAMAHA CDRW6416S Kit / OEM	$487 / 298

SPEAKERS

ALTEC LANSING PowerCube ACS44 / ACS48	$118 / 180
GNT-5000A w/ Subwoofer	$60
CAMBRIDGE Desktop Theatre 5.1	$378
YAMAHA M8 / M15 / M20 / MS28 Speakers	$58 / 82 / 89 / 98

CONTR

ADAPTEC PCI SCSI 2940UW / 2940U2W OEM	$289 / 319
TEKRAM PCI 310, 310U / 390U / 390UW	$41 / 79 / 118 / 277
PROMISE ULTRA66 PCI w/Cable	$77

NETWO

3C905 PCI Fast Link 10/100BaseT (OEM)	$78
ACER Combo ISA / PCI / ACER 8 Port Hub	$25 / 37 / 68
D-LINK 5/8 Port Mini Hub	$68 / 89
SAMSUNG SmartEther 10/100 4	$116
D-LINK 10/100 4 Port PCI Network Starter Kit	$184

MODE

ACER 56K Int. Voice SVD SPKV 8X ISA / PCI / EXT	$74 / 46 / 104
DIAMOND PCI 56K SupraMax Voice Int. V.90	$58
USR 56K Sportster 56K Voice Int. V.90 [illegible]	$115 / 78 / 185
USR 56K V.90 PRO Data / Fax / Voice Ext. w/ USB	$722

ACCE

15" / 19" / 24" AT Tower Case	$45 / 68 / 85
[illegible] ATX Tool free 250W 17" / 24" / 24" 300W	$84 / 115 / 131
A-TOP 21" ATX Tool Free 300W w/ 1 Extra Fan	$134
SUPERMICRO SC-750A PCI 2.01 Compliant	$286
CHASSIS Fan ASUS 3-Pin, Generic, CPU Generic	$20 / 18 / 12
SOCKET 370 TO SLOT 1 Converter MSI	$45
LOGITECH Trackman Marble / FX	$84 / 110
104 Keys PS/2 / PS/2 Win95 / 98 Keyboard	$22
[illegible] Win95 Natural K.B. with TouchPad	$83
MS Natural Elite Keyboard PS/2 / USB	$48 / 78

VIDEO

ATI All-In Wonder PRO 8MB PCI, AGP / Wonder 128	$167 / 157 / 245
[illegible]	[illegible]
ATI AGP 16MB XPERT 128 / XPERT 2000	$128 / 148
S3 Virge 4MB PCI / AGP	$42 / 42
MATROX AGP Marvel TV 8MB	$376
[illegible]	[illegible]
CREATIVE Banshee 16MB Retail AGP	$89
DIAMOND Viper v770 TNT2 OEM 32MB	$155
CREATIVE TNT2 32MB AGP Ultra	$287
GUILLEMOT Xentor TNT2 32MB Ultra	$279
CREATIVE 3D Blaster Annihilator 32MB GeForce *NEW!*	$379
PowerColor Sniper TNT2 M64 32MB TV Out	$148

MONITO

Monitor	Size	Model	DP	Resolution	Price
Acer	15"	54E	0.28	1280x1024	$214.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
LG	17"	795FT	0.24	1600x1200	$611.00
Panasonic	17"	E70I	0.27	1280x1024	$338.00
Panasonic	17"	BL76	0.27	1270x1024	$449.00
Panasonic	17"	PL70I	0.25	1600x1200	$609.00
Panasonic	19"	[illegible]	0.25	1600x1200	$747.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Optiquest	15"	V55	0.28	1280x1024	$250.00
Optiquest	17"	Q71	0.28	1280x1024	$338.00
Optiquest	17"	V73	0.28	1280x1024	$458.00
Optiquest	17"	V75	0.26	1280x1200	$471.00
Optiquest	19"	Q100	0.26	1280x1200	$499.00
Viewsonic	17"	E771	0.27	1280x1024	$329.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Impression	15"	5 Plus	0.28	1280x1024	$181.00
Impression	17"	7 Plus	0.28	1280x1024	$290.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Samsung	17"	7E	0.26	1280x1024	$300.00
Samsung	17"	700S	0.28	1280x1024	$300.00
Samsung	17"	700IFT	0.25	1280x1700	$458.00
Samsung	19"	900IFT	0.22	1600x1200	$770.00

PRINTER

Brand	Model	Description	PPM	Price
Brother	HL1000	600DPI	10	$305.00
Brother	HL1040DX	600DPI	10	$420.00
Brother	HL1660DX USB	1200DPI	10	$533.00
Brother	10ME	1200DPI	17	$1,258.00
[illegible]	Stylus 740	[illegible]	7	[illegible]
[illegible]	Stylus 900 *NEW!*	1440x720	10	[illegible]
[illegible]	Stylus 760	[illegible]	7	[illegible]
Lexmark	Z11	1200dpi		$149.00
Lexmark	Jet 5100	600x600	5.5	$144.00
Lexmark	Jet 3200	1200x1200	6	$180.00
Lexmark	Jet 5770 Photo	1200x1200	8	$373.00
Lexmark	Optra E+	600x600	6	$491.00
Lexmark	Optra E310	600x600	8	$578.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
HP	610C	600x600	4	$142.00
HP	810C	600x600	6.5	$225.00
HP	710C	600x600	9	$230.00
HP	722C	600x600	8/4	$340.00
HP	880C USB	600x600	8/5	$340.00
HP	1100A	600x600	8	$720.00

SCANN

Scanner	Model	Color	Resolution	Price
Artec	1230P	36	600x1200	$108.00
Artec	1230USB	36	600x1200	$163.00
Artec	AM12E Plus	36	600x1200	$119.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Color Page View	30	300x600	$160.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Canon 300P	30	30	1200x1200	$137.00
Canon	620P	36	2400x2400	$166.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Agfa	1212P	36	600x1200	$138.00
Agfa	1236S	36	600x1200	$281.00

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- 56k int. voice fax modem v.90
- Diamond / Creative AGP 32MB
- 10" ATX Case with 250W
- Fujitsu 8725 PS2 keyboard
- Logitech mouse w/ pad
- Windows 98 ver. 2 w/cd

$1670
for Intel PIII-600

$1280
for Celeron -500

$1200
for Celeron -466

Optional (w/system only)

MS Sot 2000 Word Int	+$185
Canon BJC 2000C Printer	+$450
15" 17" SVGA1280 .26	+$180/290
20 17" NEC FE700 .25	+$340/400
MAG XJ700T 17" .25	+$390
Viewsonic E771 E773	+$330/400
Panasonic PL70/S190	+$530/620
Optiquest V95 E790	$500/550

Black series

Black ATX Tower case with 250W power	$100
Black 1.44 FD Tray	$40
Black 40x side Toshiba CD-ROM	$135
Black 40x ext. Toshiba CD-ROM	$140
Black Toshiba DVD-ROM Drive	$190
Black Wight PS2 keyboard	$30
Black Ps2 mouse	$11
Black MS-mouse Ps2	$30

K6-II 3D 450mhz $650

- MS P5 100mhz bus Super 7 socket
- 32MB 8ns SDRAM DIMM [64M +$70]
- 6.4MB Ultra IDE [10.4GB +$40]
- 4MB SVGA built-in
- 1.44 Fujitsu floppy
- 3D sound card built-in and speakers
- 50x CD-ROM int. Eide
- 13" Hi-level tower case w/230 power
- 104 win95 KB and Mouse, Mouse Pad
- 56k voice fax modem v.90 int.

K6-II 3D 350/400/450	$570/590/650
K6-III 3D 400/450	$660/700

Optional

Windows'98 full ver with cd	+$110
15" 17" SVGA 1280x1024	+110/280
Epson 640/ 1JC7000	+$200/150
Colorado 600P scanner [After rebate]	$115
.25 17" monitor	$360

BLUE TOWER / BLUE KB...$90/20

Celeron: iComer !!

- AGT socket 370 PGA main board
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- UltraIDE 13.3GB HD
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- ATX tower case and ATX power
- PS2 104 KB and PS2 Mouse
- 10x cd-rom 40x 3D Sound included
- 56k voice faxmodem v.90 100W speaker

Intel Celeron 400/128k	**$1000**
Intel Celeron 433/128k.	**$1010**
Intel Celeron 466/128k	**$1030**
Intel Celeron 500/128k	**$1080**

Optional

w/128MB SDRAM +$100 w/ 17 SG	+$40
Optiquest Q71 / E771 E773	+$20/40/110
RockLive 2000 4 spkrs + subwoofer	+$50
MS Windows 98 ver 2 w/ cd	+$130
MS Office 2000 pro	+$450
10 BT NIC int $20 10/100BT NIC	+$25

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128MB SDRAM PC100mhz
17G Ultra IDE
ATI Fury 32M AGP
1.44G FD 50x CD ROM
Sound Blaster Live value
USR 56k voice fax modem
Landmark 19" ATX w/250W with case fan
104 Fujitsu 8725 keyboard
Microsoft Intelli mouse w/wheel and pad
Windows 98 full ver 2 with cd

Intel PIII-500mhz.	**..$1600**
Intel PIII-550 /600	**.$1780/1930**

Upgrade to

20GB 7200 ATA66 HD	...+$100
upgrade CD ROM to SONY DVD	+$60
Diamond TNT2 V770 32M / Ultra	+$free/80
ATI All in Wonder AGP 16M/32M	+$80/160
Sound Blaster Live! Mp3 / Platinum	+$70/ +$190
ViewSonic E773 / PS775 / PS790	$400/550/690
Panasonic SM70/ PL70 / SL90	+$420/550/620
Voodoo 3 3000 3D with 16M AGP...	+$30

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PIII 600 256M/10-100TX/32x/Dual-UW raid	$8950

Netfinity 7000

P III Xeon550/256M/10-100TX/32x	$9690

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Compaq Servers (Compaq whole line)

Proliant [illegible] ATX/2 [illegible] Win98/NT 4 Server $4100
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Intel Servers (Intel whole line products)

SC450NX [illegible] 550 CPUs [illegible] 1024 MB ECC [illegible] Video [illegible] 12% hot swapable [illegible]

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Dual U2W scsi built on board and Raid function ready
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AGP 32MB Video
256MB ECC SDRAM PC100
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2x 9.1GB U2W SCSI HD
Fujitsu KB and Microsoft mouse

Intel P-III 500 /550 / 600mhz	**... $2860/ 3000/ 3180**
Dual P-III 500 /550 /600 mhz...	**$3228/ 3500/ 3800**

(upgrade to Dual 18G U2W scsi +$620)

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MOTHERBOARDS

Abit BH6 [Slot 1] / BM6 [s370] 440BX ATX PII	$145/135
Abit WX6 VA6 ATX AGP PII/ PIII	$190/130
Abit BE6 BE6-II 440BX ATA66 ATX PII/PIII	$190/215
Intel Cc820 / Cc120 w sound	$200/$210
Intel SE440BX2 / SE440BXPA PII/PIII ATX	$180/155
Intel RC440BX FM and SR440	$220/230
Intel T440BX scsi N440BX Dual U2W	$460/590
SuperMicro P6DBU 440BX Dual PII/PIII U2W sub	$590
SuperMicro P6DBE 440BX Dual PII/PIII UIDE	$270
SuperMicro P15CD 820 PE /PIII 533-733	$220
Supermicro P6DGU / S2DGU 440GX-Xeon	$650/850
Supermicro P3DME 73DMU 820 Dual /U2W	$400/700
Asus P2B-DS 440BX Dual PII U2W scsi ATX	$650
Asus P3B-F 440BX AGP PII/ PIII 233-600	$195
Asus P3C2000 P3CWE 820	$245/300
Asus P5A ATX P5A-B AT 100mhz AGP...	$140/130
Celeron S370 8M AGP audio ATX / Slot 1	$120/105
Socket 7 ATX with AGP 4M Audio ATX...	$110
Asus K7M / MSI 6167 for AMD Athlon (k7)..	$200/235
Gigabyte Motherboard for AMD Athlon (k7)	$230
Intel 440BX Quanta ATX AGP	$121

CPU

Intel P5 MMX-233	$75
Intel Celeron 400/433	$95/110
Intel Celeron 466/500	$140/200
Intel Pentium II 500 / 550 /600	$310/500/680
Intel PIII 533 / 600 with PC133mhz	$620/790
Intel PIII667 / 700 /733 Pc133	$790/1000/1160
Intel Xeon P-II 550/512k	$1490
AMD K6 II 400 /450/475	$80/100/150
AMD K6 II 400/450 256k	$100/160
AMD K7 500/550/600/650	$320/440/660/930
AMD K7 700mhz ... $1050 K7 CPU fan	$15
CPU fan Pentium / II /Pro	$7/10/15
S370 adapter v1.0/v1.1 (dual)	$15/25
Dual PII fan / Dual K7 fan	$25

VIDEO CARDS

CL5446 1M / 2M PCI	$20/25
S3 Virge 3D 4M AGP	$40
ATI 8M AGP / ATI Xpert98 8M AGP	$70/75
ATI Xpert@play 8M PCI/AGP	$95/95
ATI xpert'99 AGP 8M / Rage128 16M	$95/130
ATI TV Tuner Wonder PCI	$125
ATI All-in-Wonder Pro 8M AGP/PCI	$180 /190
ATI Fury128 32M / Fury MAXX 64M AGP..	$155/400
ATI All-in-wonder128 w/ 16M AGP/PCI	$225/235
ATI all in wonder 128 w/32M AGP	$335
Matrox G400 32m /Dual ports	$2[illegible]
Matrox G400 32M MAX AGP	$[illegible]
Diamond S3 Savage4 32M AGP	$115
Diamond 770 TNT2 32M Ultra AGP	$150/220
Creative S3 Savage4 12M AGP	$115
Creative TNT2 32M /Ultra AG	$170/250
Creative GeForce 12M/ GeforcePro 32M AGP	$360/470
3DFX Voodoo3 2000 16M AGP /PCI	$160/170
3DFX Voodoo3 -3000 16M AGP (OEM / B)	$190/220
3DFx Voodoo3-3500 16M AGP w/ Tv in & Tvout	$360
Mxu 3D	$1100

HARD DRIVES

Fujitsu 8.4/13.3/20G	$[illegible]
Quantum LX 13.3/20GB	$[illegible]
Quantum KX 13G/20G	$[illegible]
WD ATA66 8.0/13.5/20G	$155/19[illegible]
WD Expert 9.1 13.3/20G 27G	$190/270/290/350
Maxtor UIDE 8.5/13.6 17G	$155/190/210
IBM 7200 13/17 20	$200/280/300
Quantum Atlas-4 U2W 9.0/18/36G	$380/640/1250
IBM U2W 9LP DDRS 9G/18G	$370/640
IBM U2W ZX 9G/18G (1024rpm)	$690/1150
Seagate Barragada 9/18G U2W	$450/720
Seagate Sheta 9/18.2/40G U2W	$680/990/1390
Removable HD for EIDE/SCSI/U2Wscsi..	$20/25/40
U2WSCSI 4Bay/8Bay case w/power	$150/250
Hot swapable HD HP / Compaq and IBM	call
Adaptec 2940U UW /U2W	$215/270/310
Adaptec KIT 2940 /2940UW/2940U2W	$230/280/330
Toshiba Notebook HD 6/10G	$300/450

RAM

72pin 16/32/64M 128M EDO	$55/80/170/430
Parity 72pin 32 / 64/128M	$95/190/440
30pin 1M / 4M	$[illegible] 15
SDRAM 32M / 64M PC100	$75/110
SDRAM 128M / 256M PC100	$250/435
SDRAM 64M / 128M PC133	$150/250
ECC SDRAM PC100 64/128/256	$160/280/600
SGI Video RAM 512k/1M	$10/20
SO-DIMM 72p 8/16/32M	$60/80/150
SO DIMM 144p 16/32/64M SDRAM	$60/80/170
SO DIMM 144p 32 64/128 EDO	$100/200/400
RAMs for printers	available
Toshiba IBM Dell notebook RAM	[illegible]

MODEMS

56k Voice Fax modem int V90 ISA/ PCI	$25
USR 56k v90 fax modem int PCI	$60
USR Sportster v.90 PCI (2976-81) / ISA	$105
Supra 56k v90 Voice PCI/ISA	$50/110
3COM/USR 56k v.90 ext / voice	$195/255
Ascend P220 Router	$2280
Cisco 250-CH IP Drivers	$2370
PCMCIA 56k v90/with 100BT	$70/125
PCMCIA 100T combo / 10-100BT	$60/100
Xircom 56k RealPort modem	$340

MONITORS

SVGA15 17 .28 17 .21	$150/2[illegible]
17" .25 Monster Special	$330
MAG XJ500T 25 15" / XJ700T ..5 17"	$210/400
MAG XJ810 19"	$590
Mitsubishi Plus72 17" 900U 19	$690/900
NEC FE700 21 Flat E750	$400/690
NEC E950 /P1250	$850/1300
Panasonic SM70/PL70/SL90	$410/550/630
Panasonic P110 21	$1[illegible]50
Panasonic GF70 flat	$520
Sony E200/210GS/220GS (17)	$520/490/590
Sony 420GS/520GS	$800/1450
Sony F400 / F500	$1490/2680
Viewsonic Q71 E771/ E773 .25	$300/330/400
Viewsonic PS775/ PS790 /PB15	$520/690/1280
ViewSonic E790/ GF775 / MB110	$550/990/1430
ViewSonic Vg150 / VPA150...	$1600/170
Samsung 700IFT 17" Flat	$480
Samsung 900IFT Flat monitor	$760
Samsung530TFT 1024 LCD Flat Panel	$1390
Samsung 591TFT 18" LCD Panel	$1890

NetBook ACCESSORIES

32M/64M SDRAM/EDO	$ [illegible]
NiMH Battery	$110
Li-Ion battery	$240
•Car auto adapter	$100
AC Smart adapter (110/220V)	$110
•Toshiba 2.5" 4.9G 6.0 HD	$240/310
•Toshiba 2.5" 10G / 12G HD	$370/420
•Portable Printer BJC 30 50	$ [illegible]
•IBM 4.8G 96G 2.5" HD	$240/310
•PCMCIA 10BT/Combo card	$70
PCMCIA100BT card	$100
Portable Printer MP340	$360
PCMCIA serial port/dual	$250/310
•Flash RAM card player	$100
•D-Link 56k/ 10 100	$125
PCMCIA 56k faxmodem	$80
•PCMCIA 56k/100BT RealPort	$490
Stick PCMCIA drive w/40M disk	$370

CONTROLLERS

IDE SA Super I/O	$30
•Dual UIDE ATA33 PCI controller	$40
•Dual UDIDE ATA66 PCI controller	$85
•Mylex SCSI 930T (2940 scsi)	$170
•Mylex UW scsi 950T (2940UW)	$185
•Mylex U2W scsi 958T (2940U2W)	$260
Adaptec 2940/2940UW	$220/270
Adaptec 2940 U2W/ U2W kit	$300/330
Adaptec AAA [illegible] AAA131 kit	$590/990
Adaptec APA 1460 slimSCSI kit	$220
Adaptec APA1480 slim (cardbus)	$300
Adaptec 3940 Dual scsi-II	$510
Adaptec 3940UW Dual UW scsi	$589
Adaptec 3950U2W Dual U2W	$685
Adaptec 3945 Hot Connect.	$870
Adaptec 3940 Fiber /950	$1100/1190
Jaz PCMCIA to SCSI II adaptor	$150
Jaz Parallel to SCSI II version	$75
scsi / Lancast U2W 8bpin UIDE Mpan	[illegible]

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Intel [illegible] 820 motherboard
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[illegible] MB SDRAM PC133 [illegible] HD ATA66 port
Landmark ATX [illegible] tower w 250W [illegible]
Toshiba 8x DVD [illegible] drive
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Xeon-550 /512k L2 System

Intel 440GX 100mhz bus dual 2 ATX
[illegible] MB Pc100 SDRAM DIMM
1.44MB floppy drive
18.2GB U2W scsi HD
32MB AGP video card
[illegible] ATX tower case
50x CDROM
56k voice/fax modem USR Sportster
Fujitsu 104 Keyboard
Intel 100BT NIC
Microsoft Intellimouse w/pad

- **Intel Xeon PIII 550mhz/512k...$3500**
- **Intel Xeon PIII 550mhz/1MB ..$4790**
- **Intel Dual Xeon PIII 550/512k..$4930**
- **Intel Dual Xeon PIII 550/1M....$7690**

Optional

with Dual 19G U2W/CSI	+$640
with RAID UW scsi ctrl	+$590
with RAID W2W scsi ctrl	+$990
with ATX Redundant Power	+$300

NetBook ™ 12"/13" TFT

[illegible]
32MB RAM [illegible] 64MB +$90)
4.1G [illegible] +$50)
56k voice [illegible] modem Built-in
1.44 Floppy & [illegible] CD-ROM Built-in
Active True color TFT Touch Pad PS/2 port
2 PCMCIA slots (2 Type II or One Type III)
USB Infra, Parallel serial Ext SVGA
3D sound Microphone & speakers built-in
NiMH Battery (with Li-Ion +$100)
AC adapter (110-220v).
FREE carrying case
MSWin 98 full ver 2 w CD and license
All drivers preload and with cd

- 12.1" TFT 300-366/ 400mhz.....$1600/2930
- 13.3" TFT 300-366/ 400mhz.....$1400/1950

with Car adapter	+$100
with 10BT pcmcia card	+$70
with 10/100 BT card	+$100
with 56k & 10/100 Lan	+$150
with 64MB 96MB	+$90 / 180

NetBook ™ PIII 13"/14" TFT

Intel PIII [illegible] CPU [illegible] HDD
64MB RAM ([illegible] MB +$100)
6.1G Toshiba HD (12.0G +$250)
AGP 8M Video built in
RealPort 56k voice fax modem
1.44 Floppy 24x CD-ROM (DVD $250)
TFT Active True color 1024x768
3D sound, Microphone & spkr built in
Dark-Silver USB Infra, Parallel, serial
2 PCMCIA slots, S-Video out-put
Li-Ion Battery w/ Led
AC adapter (110-220 auto switch)
FREE carrying case
Win 98 full ver With cd
All drivers preload and with cd

- 13.3" TFT PIII-450/500 ... $3100/3250
- 14.1" TFT PIII-450/500...$3200/3390

Silver Celeron 13"/14" TFT

13.3" [illegible] TFT [illegible]
AGP 8M 3D Video card built in
Silver body color. All-in-one 6.2LB only
Intel Mobile Celeron 333/366/400/466/500mhz
64MB RAM (96M $100 | 128M +$300)
6.1GB Toshiba notebook HD
RealPort 56k voice fax modem
1.44 Floppy 24x CD-ROM (DVD.... +$250)
3D sound, Microphone & speakers built in
USB Infra, Parallel, serial Ext SVGA port
2 PCMCIA slots Li-Ion Battery
AC adapter (110-220 auto switch),
Win 98 full ver.2 with cd, FREE carrying case

- 13.3"TFT Celeron 400/466/500...$2600/2690/2750
- 14.1"TFT Celeron 400/466/500...$2750/2800/2900

Silver PII 14.1" TFT Netbook

14" TFT [illegible]
AGP 8M 3D Video card built-in
Silver body color All-in-one 6.2LB only
Intel Mobile PII 266/300/366/400 CPU
64MB RAM (96M +$100 | 128M +$300)
6.1G Toshiba notebook HD
RealPort 56k Voice fax modem
1.44 Floppy 24x CD-ROM (DVD +$250)
3D sound, Microphone & spkr built-in
USB Infra, Parallel serial, SVGA port
2 PCMCIA slots Li-Ion Battery
AC adapter (110-220 auto switch)
Win 98 full ver 2 with cd, FREE carrying case

- 14.1" TFT PII 333/366.... $2820/2900
- 14.1" TFT PII 400 ...... $3150

As one of the major providers of the notebooks in Vancouver we had sold over 2000 units of **Netbook** in western Canada. As the factory **authorized service center** we provide upgrade service for Toshiba IBM, Compaq Fujitsu Acer Asus Sharp [illegible] eWebook Netbook Sceptre, and other clones ...

Toshiba

4070CDS	• Cel366/64M/4G/13.3" DSTN/W98/56k	$2900
2100CDS	• K6-400 32M/4.0G/12. DSTN/W98	$1850
4000XCDT	• PII366 64M/6.4G/14.1" TFT/Win98	$3140
1020CT	• P266MMX/32M/6.1G 10.4" TFT/Win98	$2000

IBM ThinkPad On WWW.ATIC.CA

Compaq *Presario and Armada [illegible]*

On WWW.ATIC.CA

PRINTERS

HP

HP DJ 340Cl [illegible]	$300/225
HP 880 895C 1120C	$350/500/650
HP 2000C / 2500CM	$600/ 450
HP [illegible] 2100 RPM	$560/ [illegible]
HP 4050 4050N/4050TN	$1640/2290/2450
HP 5000 5000N/GN	$3360/3360/3680
HP 8100/8100N/8100DN	$[illegible]/3030/4190
HP Color laser 4500/4500N/4500DN	$3640/4330/5550
HP LaserLaser 8500/8500N/8500DN	$8600/9700/12890
HP OJ 775C color printer copy/scan/fax	$565
HP [illegible] 3100X printer copy scan/fax 8p	$960
HP Color Plotter/ HP accessories	www.ATIC.CA

Canon

BJC 1000C BJC 2000C / 6000	$135/150/360

Lexmark

Lexmark 711 751	$140/320
Optra E310special	$550

Epson

Stylus 440/660/740	$160/220/330
Stylus 1520 / 1440dpi 850N	$420/690
Stylus [illegible] 900N	[illegible]

Brother

HL 1060DX 12ppg	$480
Toner Tn100 Tn460	$35

Okidata

OL8W 600dp laser	[illegible]

CASE / KB /MOUSE / Cables

AT [illegible] case&power	$[illegible]
ATX 15 16 21 case &power	$45 50 80
InW's ATX case 17" 24" &power	$60/100
Server 2 in 1 [illegible]	$[illegible]/690
Landmark ATX 299 plastic extra fan	$105
Landmark 19 ATX 202 250 w [illegible] 50W more fan	$85
Mouse Logitech 2B / Logitech 20 w/wheel	$[illegible]
MS IntelliMouse / IntelliExplorer USB	$75/95/80
Logitech Marble mouse USB	$[illegible]/90
Logitech Internet KB cordless mouse & KB	$40/140
104KB Fujitsu8725 Fujitsu 8725	$[illegible]
MS Natural / TouchPad KB.	$30/65
MS natural USB / USB keyboard	$75 130
Black KB Blue KB	$20 20
Black mouse MS black mouse	$20 25
Scsi cable/ Wide scsi cable	$10 15
over 4 Services cable (scsi/UW scsi)	$35
Ext. Scsi cable / 25p-HD50p/25p-HD68p	$25/40 /40
ext Scsi cable (sys [illegible] Centronics)	$40
Rock mounting IDE/SCSI drawer	$20/25
Rock mounting UW [illegible]	$45
Printer cables 6ft/10ft/25ft	$5/10/18
MoSem cables/Laplink cables	$10/15
[illegible] cables	[illegible]

MULTIMEDIA

DVD KITS

Toshiba 8x/12x Hitachi 8x [illegible]	$ 45 155
Creative DVD4 Encore [illegible]	$340
Black DVD drive	$170
Hollywood decodable card	$ 40

SOUND CARD

[illegible] SB PCI 64 SB PCI128	$20/35 50
SoundBlaster PCI Live X-Gamer / Live. MP3	$[illegible]
SB PCI Live Value Live Platinum	$80/260
Diamond Mx300 oem retail	$95/115

CD-ROM

Creative [illegible] Toshiba 40x [illegible]	$70 75
Acer 50x Black Toshiba 40x...	$60/100
40x scsi Pioneer Toshiba 40x scsi	$150 130
Backpack 18x parallel [illegible] with sound	$240

CD WRITER

Creative 8432 Rewrite w/pcs (retail)......	$355
HP 9115 4/4 32 retail kit	$370
HP9210i scsi 32x/8x4x retail kit	$420
Sony CRX140 [illegible] 24x4x4x w/pcs.	$355/390
Yamaha 4416e scsi 16x4x4e [illegible] kit	$295/350
Yamaha 4416SX ext	$500
Plextor 8432 retail int [illegible]	$390
[illegible] Sony	$1 8/2 2
Rewritable cd disk/Sony	$6 10

SPEAKER

70W Subwoofer 420W	$12 $30
GNT2000 subwoofer [illegible] Eastern 4100	$55/$65
RockLove 2000A Subwoofer with spkr	$55
Eastern [illegible] DA 9000	$270
Yamaha M20 w/Sub [illegible] M10	$ 15 190
Altec ACS45 [illegible]	$125 180 310
Creative PC Works 4point [illegible]/2000	$ 30/230
MicroPhone Headset	$8/15

TITLES (w/CD-ROM kit or system [illegible])

MS Sun 2000 w/ [illegible] Money	$150
Corel [illegible] 2000	$50/60
[illegible]	$[illegible]

SCANNERS

HP [illegible]	$[illegible]
HP 1[illegible]	$545
600x [illegible] Parallel 30bit [illegible]	$99
[illegible]	$125/255
Acer 620P 620S 620U	$151 160 150
MicroTek X5 USB X6-EPP X6-EL..	$145/185/300
OEM 600x1200 flat scanner	$100
AGFA Snapscan 1212P 1236S/1212U	$140/150/285
Canon [illegible]	$[illegible]

CAMERA / CAPTURE

Miro DV300 PCI Studio 400 [illegible]	$[illegible]
Miro DC 30 Plus	$1190
Canon A5 Zoom / A5dU	$615/711
Kodak DC220 ZOOM Dc265 Digital	$700/1100
ATI TV tuner with FM	$ 130
Logitec Qi cam VC Home /pro.	$110/150 180
Creative WebCamIII USB	$110 in special

ZIP / TAPES / ORB

HP 4C SC Travan	$ 61
Seagate TR [illegible] int	$[illegible] 350
Seagate DAT 4-8G 4mm w/sw	$960/1150
SONY DAT 5000 4mm 4G 8G drive	$930
HP DAT 4G 90mm 4-8G 125mm	$890/1650
[illegible] PCMCIA Reader [illegible] desktop	$90
ZIP 100M [illegible] parallel	$100/155
ZIP 100M scsi int/ext/ USB	$165/210/210
Zip 250 Parallel/ USB	$250/250
[illegible] 2G ext int/ext	$360/480
Zip disk Jaz disk 1G Jaz 2G.	$15/110/160
JAZ traveler SCSI to Parallel adapter...	$60
ORB 2.2G Int EIDE 1 disk	$270 65
ORB 2.2G ext Parallel with disk	$350
ORB 2.2G ext scsi with 5 dis	$480
Travan TR1/TR3/TR4	$20/25/35
1 of 20 super drive int. 5disk	$120/45
DAT disk DDS 2 DDS-3	$25 40
Stick drive PCMCIA w [illegible]	$390/20

NETWORKS / UPS

[illegible] ISA combo 10BT [illegible]	$ [illegible]
[illegible] 10/100BT Ethernet	$25
[illegible] 5[illegible] 10/100BT	$25
Intel PCI Pro 10/100 [illegible] Server Pro	$50/130
3COM PCI 3C905 100BT	$70
BNC Terminal [illegible]	$3
[illegible]	$[illegible]
Hub 10BT 5 port/ 8port 16port	$45 55 120
Hub 100BT 4 port 100BT 8 port	$75 [illegible]
Hub [illegible] 8port	$ [illegible]
[illegible] OfficeConnect 3C16700 8P 10BT	$ [illegible]
[illegible] 3C16702 [illegible] 10BT	$ [illegible]
[illegible] OfficeConnect 3C16750 8P 10/100BT	$700
Hub [illegible] 12p 10BT	$[illegible]
Hub [illegible] 12p 3C16410	$[illegible]
Hub [illegible] 3C1641	$1 80
Hub 4P [illegible] 24 port (QTY limited)	$[illegible]
Hub HP [illegible] 100BT 12/24port	$1200 900
Hub D-Link 10BT DE805 5p DE809 8p	$70/95
Hub D-Link 10BT De812 12p DE816 16p	$100/230
Hub Intel InBusiness SH100T 100BT 8p.	$260
Hub Intel InBusiness [illegible] 10/100BT 8p	$330
Router Intel Internet station SH100TPS	$580
Router Intel Internet Express 9100/9300/9200	$WEB
Switch Hub 3COM/Intel	list on WWW.ATIC.CA
NT 4.0 Server 5 10	$1000/1200
NT 4.0 Server 25	$2190
NT 4.0 client access license/each	$45
NT Workstation 4.0 license	$210/260
MS BackOffice server V2.0/2.5	$2150/3100
MS SMS [illegible] 2 10/25 users	$1620/2200
MS SNA 3.0 w/5 users	$1690
UPS 300/500/650	$150 190 200
UPS Smart 450/700/1000	$300/450 690
UPS Smart1000/2200/3000	$820/ 1290/1990
SurgeArrest Personal 7 w tel	$25/30
SurgeArrest Pro 11 w/tn	$37/67
SurgeArrest Net 7 w tel	$40/55

Notebook Accessories

- **Modems and EtherNet (PCMCIA)**

56K PCMCIA fax modem v.90	$10
PCMCIA 10BT Ethernet cards	$70
Xircom 100BT	$210
Xircom 100BT + 56k fax modem RealPort	$490
3COM 10/100BT PCMCIA (3CXFE575BT) cardbus	$270
3COM 3757h TX 10 100 LAN [illegible]	$[illegible]
3COM 10BT (3CXE589DT) 10B Com (3CXE589OC)	$190/250
3COM 3CCM156B 56K global modem	$320
3COM 56K V90 Fee modem w/ Cellu support (3CXM556)...	$325
3COM 56k with 10/100BT LAN	$440
3COM 52900 128k ISDN PC card Unit	$530
3COM52905 128k ISDN PC card S/T unit.	$475
Intel Etherexpress Pro 100BT PCMCIA [illegible]	$220
Intel EtherExpress Pro Plus 10/100 PCMCIA	$370
Intel EtherExpress Pro 100 with 56k v.90 modem	$400

- **Batteries, Sound Cards, Backup, SCSI**

Adaptec 1450/1460/1480 SlimScsi	$140/230/290
ext parallel CD-ROM 40x / with power	$140
ext scsi 40x CD-ROM with case	$210
32x Backpack cd-rom parallel / with sound	$300/360
NewMedia sound / game port.	$280/[illegible]
NewMedia SCSI DB25 [illegible] LAN 10BT	$125 110
Nogatech PCMCIA TV tuner	$385
Carrying case Targus Notepac CN01/20	$40/35
Universal case CUNI Leather case CLNI	$100/120
Platinum Leather case CPLCII Traveler CL86	$210/160
Koskin case CKN2/Convertible case CCB1	$80/70
Encore Air Leather case CLLIA ...	$200
Battery NiMH [illegible] Netbook	$110/180
[illegible]	[illegible]

Cases

Landmark

Three-Piece-Cover Unit
No Hand-Cutting
Elegant Look
Better Ventilation
Two Optional Spaces for Fan
Stand-Off Metal
[illegible] M/B with stand-off metals instead of brass screws

Extra House fan

ATX 200 19 350W Extra fan	$85
ATX 202 19 250W Extra fan	$85
ATX 298 19 250W Extra fan.	$85
ATX 299 19 250W Extra fan	$110
ATX 102 24" 300W Extra fan	$140
ATX-2000 24" 2x300W Redundant PS ...	$390
ATX-Blue 19" 250W Extra fan	$90
ATX-Black 19 250W Extra fan	$90

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HP 8200i 4x4x24x IDE CD-Writer	$293
Creative 8432 CD-Rewriter	$385
BASF/ Sony CD-R Media (10 pc)	$16/20

Matrox Mill G400 32M Dual Head Max AGP	$318
Creative GeForce 32M/ Pro	$328/388
Asus 6600 GeForce 32M Pure/Deluxe	$348/418

NEC FE700 17" Monitor	$398
Viewsonic PF775 .25 17" Monitor	$510
Viewsonic PF790 .25 19" Monitor	$748

Intel Pentium III Dream Machine for Power User

Pentium III Power User

Intel Pentium III CPU w/ 512K Cache
ABIT BF6 (Asus P2-99) M/B
64MB PC100MHz SDRAM
Panasonic 1.44MB FDD
10.2GB Ultra66 HDD
ATI Rage 3D 8M AGP Video
15" N-I L-R SVGA Monitor
Acer 107 Win 98 Keyboard
ATX Tower w/ 250W P/S
MS Trekker Mouse & Pad
Creative 52x CD-ROM
Acer 3D Wave Stereo Sound
120W Stereo Speakers

64MB 10.2GB
15" SVGA Monitor
ATI 8M Video
52X CD-ROM

P-III-500	1238	$43/mo*
P-III-600	1588	$55/mo*
P-III-650	1818	$63/mo*

Pentium III Dream Machine

Intel Pentium III CPU w/ 512K Cache
ABIT BF6 (ASUS P2 99) M/B
64MB PC100MHz SDRAM
10.2GB Ultra66 HDD
Panasonic 1.44MB 3.5" FDD
Riva TNT2 16M AGP Video
Samsung 750S 17" Monitor
Acer 107 Win 98 Keyboard
ATX Tower w/ 250W P/S
Acer USB Wheel Mouse
Creative 5X DVD Drive
SoundBlaster PCI 128
280W Stereo Speakers

64MB 10.2GB
750S 17" Monitor
DVD 5X SB PCI128

P-III-500	1538	$53/mo*
P-III-550	1688	$59/mo*
P-III-600	1878	$65/mo*
P-III-650	2118	$74/mo*

Pentium III 3D Theatre

Intel Pentium III CPU with 512K Cache
Asus P3B F (ABIT BF6) 440BX AGP M/B
128MB PC100MHz SDRAM
13.3GB Ultra66 HDD
Panasonic 1.44MB FDD
Viewsonic E771 17 SVGA Monitor
Riva TNT2 32M AGP
Acer 107 W98 Keyboard
ATX Tower w/ 250W P/S
Acer USB Wheel Mouse
Creative 5X DVD Drive
SoundBlaster Live 1024
300W Spkrs w/Subwoofer

128 MB 13.3 GB
DVD 5x SB Live
E771 17" Monitor
Riva TNT2 32M AGP

P-III-500	1778	$62/mo*
P-III-550	1938	$67/mo*
P-III-600	2118	$74/mo*
P-III-650	2318	$81/mo*

Pentium III CD-Creator

Intel Pentium III CPU w/ 512K Cache
ASUS P3B F (Abit BF6) 440BX M/B
128MB PC100 SDRAM
13GB Ultra66 HDD
Riva TNT2 32M AGP
Panasonic 1.44MB FDD
Viewsonic E771 17 SVGA Monitor
Acer 107 W98 Keyboard
ATX Tower w/250W P/S
Acer USB Wheel Mouse
HP 8200i 4x4x24 CD-RW
SoundBlaster Live 1024
GMT5000 Spkrs & Sbwfr

128 MB 13 GB
4x4x24 CD-RW
SB Live
E771 17" Monitor
Riva TNT2 32M AGP

P-III-500	1948	$68/mo*
P-III-550	2098	$73/mo*
P-III-600	2298	$80/mo*
P-III-650	2498	$87/mo*

All P-III systems come with 5-year service & 2-year parts warranty and one month FREE internet

Options: Windows 98SE +$138 • Acer 56K V.90 V/F/Modem (HW) +$50 • Acer 10BT Ethernet Card +$20 • MS Office 2000 SBE +$288 • MS Office 2000 Pro +$468

Power/Budget Maximizer

Celeron Net-Surfer

Intel Celeron CPU w/ 128K Cache
ECS Dual-Slot Mainboard
32MB PC100MHz SDRAM
10.2GB Ultra66 HDD
Panasonic 1.44MB FDD
3D 8M AGP Video / 17" ATX Tower
15" N-I L-R SVGA Monitor
Acer 107 Win 98 Keyboard
Logitech 2B Mouse + Pad
50x U-DMA CD-ROM
3D Wave Stereo Sound
120W Stereo Speakers
56K Modem & LAN

32MB 10.2GB
15" SVGA Monitor
Modem & LAN

C-400MHz	798	$28/mo*
C-433MHz	818	$29/mo*
C-466MHz	848	$30/mo*
C-500MHz	918	$32/mo*

Celeron WorkHorse

Intel Celeron CPU w/ 128K Cache
Gigabyte 6LA7 AGP Mainboard
64MB PC100MHz SDRAM
10.2GB Ultra66 HDD
Panasonic 1.44MB FDD
ATI Rage 3D 8M AGP Video
Samsung 750S 17" Monitor
Acer 107 Win 98 Keyboard
15" Tower w/ 250W P/S
MS Trekker Mouse + Pad
50x U-DMA CD-ROM
Acer 3D Wave Stereo Sound
120W Stereo Speakers

64MB 10.2GB
750S 17" Monitor
ATI 8M Video

C-400MHz	998	$35/mo*
C-433MHz	1018	$36/mo*
C-466MHz	1048	$37/mo*
C-500MHz	1118	$39/mo*

Max Power Special

Athlon (K7) PowerMax

AMD Athlon (K7) CPU
Asus (Gigabyte) Athlon M/B
64MB PC100MHz SDRAM
13.3GB Ultra66 HDD
Panasonic 1.44MB 3.5" FDD
Riva TNT2 32M AGP
Samsung 750S 17 Monitor
Acer 107 Win 98 Keyboard
ATX Tower w/ 300W P/S
Acer USB Wheel Mouse
Creative 5X DVD Drive
SoundBlaster PCI 128
280W Stereo Speakers

64MB 13.3GB
Riva TNT2 32M
750S 17" Monitor
DVD 5X SB PCI128

K7-550	1698	$59/mo*
K7-600	1918	$67/mo*
K7-650	2088	$73/mo*
K7-700	2348	$82/mo*
K7-750	2588	$90/mo*

REEL SERVER

Intel Pentium III CPUx1
Intel L440GX Server Board
(Dual P-III, Onboard Video, NIC SCSI Controller)
128MB PC100 ECC SDRAM
9.1GB Ultra2 SCSI 10,000rpm HDDx1
44X CD-ROM • Panasonic 1.44MB FDD
Intel ASTOR II SVR Chassis
GVC 56K External Modem
Acer 107 Keyboard
2B Mouse + Pad

128MB RAM
9.1GB U2 SCSI HD
Intel Astor II

Option:
Adaptec ARO-1130 U2 add-in card $418
Intel Pro/100+ Server Adapter $148

P-III 500	3068	$107/mo
P-III-550	3238	$113/mo
P-III-600	3388	$118/mo
P-III-650	3588	$125/mo

All Celeron & AMD systems come with 3-year service & 1-year parts warranty and one month FREE internet

Options: Windows 98SE +$138 • Acer 56K V.90 V/F/Modem +$50 • Acer 10BT Ethernet Card +$20 • MS NT Work Station 4.0 +$298 (Free upgrade to Windows 2000)

CPU/RAM

PC100 SDRAM 32M/ 64M	$68/118
PC100 SDRAM 128M/ 256M	$238/518
PC133 SDRAM 64M/ 128M	$148/248
ECC PC100 SDRAM 64M/ 128M	$148/278
72 pin EDO 8M/ 16M/ 32M	$25/48/95
72 pin Reg 8M/ 16M/ 32M	$25/48/98
AMD CPU	
K6-II 350/ 400/ 450	$70/75/95
K6-III-400/ 450	$128/218
K7 550/ 600/ 650/ 700	$420/538/788/1440
Intel CPU	
Celeron 400/433/466/500	$108/118/149/205
P-III 450/ 500/ 550/ 600	$368/398/528/708
P III 500E/ 550E (FPGA)	$398/568
P III 550E/600E/650/700 (PC100/256K)	$call
P-III 533B/600B (PC133/256K)	$458/698
P-III 533EB/600EB/667/733 (PC133/256K)	$call

Motherboards

Pentium / K6 / K7 Motherboard	
Asus P5A-B (AT)/ P5A (ATX)	$135/136
FIC SD-11 (AMD K7)	$238
ASUS K7M (AMD K7)	$228
Gigabyte GA 7 IX (AMD K7)	$228
Microstar MS-6167 (AMD K7)	$250
Celeron / P-III Motherboard	
ABIT BF6/ BE6/ BE6-II	$178/185/215
ABIT BP6 (Dual Celeron)	$208
Asus P2-99/ P3B-F	$150/186
Asus P2BD/P2BS/P2BDS	$388/455/468
Gigabyte 6LA7 (Celeron/AT)	$118
Gigabyte 6X2000 (Dual bios)	$168
Intel CA810EA/ CA810EAL	$210/260
Intel CC820/ CC820A	$196/218
Intel SE440BX2	$160
Intel N440BX/ L440GX (server)	$738/750

Drives & Controllers

Fujitsu (UDMA66 IDE/ U2W SCSI)	
8.4/ 10.2/ 13/ 17G	$160/178/188/218
10.2/ 13G (7200rpm)	$208/228
9.1/ 18.2G U2W SCSI	$418/896
IBM (7200rpm IDE/ U2W SCSI)	
13/20/27G U-DMA 7200rpm	$218/298/398
9G/ 18G U2W SCSI	$418/868
Maxtor (Ultra 66 IDE)	
8.7/ 10.2/ 13.6/ 17G	$166/178/188/208
20/ 27.2/ 36G	$248/318/418
13/ 20/ 27G 7200rpm	$208/288/368
Quantum (UDMA66 IDE/ U2W SCSI)	
KX 13/ 20/ 27G 7200rpm	$236/298/388
Atlas IV 9.1/ 18.2G U2W SCSI	$388/868
Seagate (U2W SCSI)	
Barr 9/ 18G U2W SCSI	$538/1030
Cheetah 9/ 18G U2W SCSI	$828/1418
Western Digital (U-DMA IDE)	
10/ 13/ 20G	$185/199/298
8/ 18/ 27G 7200rpm	$228/348/418
AV Drive 9/ 18G 7200rpm	$468/728
Adaptec (SCSI Adapter)	
2930U / 2930UZ	$128/328
2940 U2W / U2W Kit	$328/388
TekRam 310/ 390F SCSI Adapter	$68/158

Tape Backup

Tecmar DHs Max Pro 10G Int.	$318
Onstream 30G IDE/SCSI Int.	$388/550
Onstream 30G Para/SCSI Ext.	$550/758
Onstream 30G Disc (3-pack)	$138
Seagate 8GB TR-4 Int. IDE/SCSI	$298/368
Seagate 4/ 8GB DAT SCSI Int	$328/738

CD Writers

Creative 8432 CDRW	$383
HP 8200i Int. IDE Kit (4x4x24)	$398
HP 8110i Int. IDE Kit (4x4x32)	$388
HP 9210i Int. SCSI Kit (8x2x32)	$398
HP 820e Ext. SCSI/ PCMCIA	$518
Yamaha 8424 IDE Kit	$388
Yamaha 8424 Int. SCSI Kit	$398
Yamaha 6416 Ext. SCSI Kit	$498
BASF/Sony CD-R (10pc)	$16/20
Princo 80min CD-R (1/10pc)	$3.2/30
BASF / Sony CD-Rewritable	$3.50/10

CD / DVD / Sound

Acer 40x / 48x / 50x CD-ROM	$60/72/75
Panasonic 32x / Toshiba 40x	$65/80
Creative DVD (5x)	$128
Pioneer 10x IDE / 6xSCSI DVD	$168/188
Sigma DVD Controller PCI	$138
Acer 3D Wave PnP Sound	$18
Diamond MX300	$110
SoundBlaster Ensoniq/ 128 PCI	$38/50
SoundBlaster PCI 512/ Live 1024	$75/80
SoundBlaster Live Platinum	$268
SoundBlaster Live Xgamer	$200

ZIP / JAZ / LS120

ZIP 100M IDE / Para / USB	$96/148/179
ZIP 250M IDE/ Para/ SCSI	$198/248/248
ZIP 100M / 250M Disc	$13/25
JAZ 2G SCSI Int. / Ext.	$448/460
JAZ 1G / 2G Disc	$115/169
JAZ SCSI to Parallel Adapter	$60
LS120 Super FDD Int. / Ext.	$98/228
LS120 Disc	$13

Modems/Camera

Altec 56K V.90 Voice/Fax PCI (HW)	$58
Motorola 56K V.90 Voice/Fax PCI (SW)	$38
USR 56K V.90 VF/M Int. PCI/ISA	$72/108
USR ISDN 128K Int./ Ext.	$268/298
Creative WebCam Para / USB	$108/118
Intel PC Camera (USB)/Pro	$118/178
Logitech QuickCam Home USB	$118
Logitech QuickCam Pro Para/ USB	$138/188

Spkr/ Mice/ KB/ Cases

USB Adapter / Hub	
PCI to USB Card/ USB 4 Port Hub	$40/55
Speaker	
120W/ 280W	$16/20
300W Set/ GNT5000 Set	$40/60
Altec ACS 45.1 / ACS 48	$118/188
Altec ACS ADA 305 / 880	$238/308
Creative 4 point FPS1000/2000	$128/268
Creative Theatre 5.1	$388
Yamaha MS 30 speaker/subwoofer	$90
Yamaha M20 speaker & subwoofer	$98
Mouse	
Logitech 2B/ 3B/ wheel mouse	$12/18/20
MS Intellimouse / USB	$32/38
Acer USB wheel mouse	$20
Keyboard	
Acer 107 / Fujitsu 8725	$13/20
Logitech Cordless KB & Wheelmouse	$108
MS Natural Keyboard / USB	$32/88
Case & Fan	
AT 15"/19" Case & 250W P/S	$38/48
ATX 17"/19" Case & 250W P/S	$50/60
Removable HDD Drawer	$28
External HDD/CD-Rom Holder	$80
Slot Fan / HDD Fan	$15/10

Printers

Color Printer	
Canon 1000/ 2000 (-$30/-$30)	$98/138
Canon 5100 / 6000	$225/318
Epson 440/660/740N(-$75/45/75)	$93/158/188
Epson 740/760/750(-$75/45/75)	$258/228/358
Epson 750/ 1200	$368/478
HP 610/ 810/ 830/ 850	$148/228/258/368
HP 970C/ 1120C/ 2000C	$568/750/688
Lexmark Z11/ 3200 (-$60 rebate)	$96/148
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Brother 1020/ 1040DX	$370/448
Brother 1240DX/ 1260DX	$448/548
Brother 4350 (-$100)	$498
HP 1100/ 2100/ 2100TN	$568/998/1298
HP 1100A/ 3100C MFC	$698/968
HP 4050/ N/ TN	$1598/2088/2288
HP 5000/ N/ GN	$2098/2988/3738
HP 8000/ N/ DN	$3158/3688/4330
HP 8100/ N/ DN	$3758/4188/4848
HP 4500/ N/ DN	$3538/4188/5388
HP 8500/ N/ DN	$8368/9408/11088
Lexmark Optra 1625/ 1625N	$1458/1828
Lexmark Optra 1855/ 1855N	$1588/2038
Samsung 5100A/ 6050	$488/568
Samsung 4600C MFC	$588

Scanners

Acer 620P / 620U / 620PT	$138/148/248
AGFA Snapscan 1212P/ 1212U	$138/188
Canon 330P (-$30 rebate)	$118
Canon 630P / 630U (-$30/-$30)	$148/188
Epson 900E/ 800A/ 800F	$948/1088/1448
HP 4200C USB / 5200C USB	$268/368
HP 6300C / 6350C USB	$515/928
Mustek 800CP / 1200ED Para	$88/148
Mustek 600 / 1200CU USB	$118/136
Mustek 9636LS SCSI	$138

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i1420	C-433	32M	4.8G	13HPA	24X	56K	$2100
i1540	C-433	64M	4.8G	12.1TFT	24X	56K	$2668
i1460	C-433	64M	4.8G	14.1TFT	DVD	56K	$2926
390X	C-400	64M	4.8G	12.1TFT	24X	56K	$2828
390X	PII450	64M	12G	14.1TFT	24X	56K	$4688
600E	PII400	64M	10G	13.3TFT	DVD	56K	$5388
600E	PII450	64M	6G	13.3TFT	24X	56K	$4688
600E	PII500	64M	12G	13.3TFT	DVD	56K	$6988

Acer

332T	PII-366	64M	6.4G	12.1TFT	24X	56K	$2868
512DX	C-366	32M	4.0G	12.1HPA	24X	56K	$1888
512T	C-366	32M	4.0G	12.1TFT	24X	56K	$2138
517TE	PII-366	64M	4.1G	13.3TFT	24X	56K	$2798
722iTX	PII-366	64M	6.0G	14.1TFT	24X	56K	$3298
723TX	PII-400	64M	10G	14.1TFT	24X	56K	$3598
723TXV	PII-400	64M	10G	14.1TFT	DVD	56K	$3838

FUJITSU

E362	[illegible]	32M	4.3G	[illegible]	[illegible]	[illegible]	$2188
E360	PII-333	64M	6.4G	13.3TFT	24X	56K	$2848
E370	PII-366	64M	6.4G	13.3TFT	24X	56K ZIP	$4088

HP HANDHELD PC

HP Jornada 430 Palm PC	$850
HP Jornada 680/690 w/ modem	$1180/1330
HP Jornada 820 w/ modem	$1350

3COM

PalmPilot V/Vx	$625/[illegible]

TOSHIBA

2100CDS	[illegible]	[illegible]	[illegible]	[illegible]	24X	56K	$1768
4070CDS	C366	64M	4.3G	12.1DSTN	24X	56K	$2388
4080XCDT	C400	64M	6.4G	14.1TFT	DVD	56K	$3088
4100XCDT	PII-400	64M	6.4G	14.1TFT	DVD	56K	$3488
8000	PII-333	64M	6.0G	13.3TFT	24X	56K	$3418
4000	PII-366	64M	9.3G	14.1TFT	DVD	56K	$4688

NoteBook Add-On's

PCMCIA CARD

Adaptec 1350 Mini SCSI Parallel Port Kit	$98
Adaptec 1460D/1480A SlimSCSI Kit	$170/245
Adaptec USB-2000 USB Kit	$98
Intel EtherExp. Pro100 16bit Card Bus	$208/208
Intel Pro100 LAN+56K Modem Cardbus Realport	$448
Linksys 100T Ethernet PCMCIA	$78
MegaHertz 3CXFE575BT 10/100 Cardbus	$180
MegaHertz 3CCFEM556 56K Modem+10/100	$315
Viking 56K PCMCIA Fax Modem V.90	$148
Xircom Realport 56K V.90 + 10/100 BT	$455
Xircom Realport 10/100 Ethernet Cardbus	$218

PORTABLE CD ROM & CD WRITER

HP [illegible] 4X4X32 CD-RW PCMCIA/[illegible]	$518
Micro Solution Bantam 24X CD-ROM	$245
Micro Solution Bantam 24X CD w/Sound	$290
Micro Solution 4X4X20 CD Writer	$438
Nogatech TV Tuner PCMCIA	$222

NOTEBOOK MEMORY & HDD & CASE

8/16/32/64M	$Call
Toshiba 4.3/6.4/10.1GB 2.5" HDD	$[illegible]/368/438
Targus Notepac CN01/CN20	$41/30

Display Centre

Video Card

SiS PCI 8M/ ATI Xpn PCI 4M	$60/68
Avermedia TV Tuner	$118
ATI All-in-Wonder 128 16M/ 32M PCI	$228/328
ATI TV Wonder PCI	$112

AGP Video Card

3D Labs Oxygen VX1 32M AGP	$338
Asus 3800 TNT2 32M/ w/ 3D Glasses	$268/308
Asus 6600 GeForce 32M Pure/Deluxe	$348/414
ATI Rage 3D 8M / Xpert 98 8M	$65/90
ATI Xpert 99 8M/ Xpert 128 16M	$108/138
ATI Xpert 2000 32M AGP	$168
ATI Rage Fury 32MB AGP / OEM	$208/198
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Acara/Proview 15" / 17" / 19"	$190/290/478
MAG 17" 770T .25	$398
Mitsubishi 17" DP70 / DP72	$488/568
Mitsubishi 19" DS90E / DP900U	$738/978
NEC 17" A700+ / E750 / P750	$428/528/850
NEC FE700 17" / FP958 19"	$398/918
NEC A900 / E900+ / P1250+	$548/978/1388
Panasonic 17" E70/ SL75 / PL70	$338/438/580
Panasonic SL90 19" .25/ S110 21" .25	$748/1288
Samsung 550S 15"/ 750S 17" .27	$198/388
Sony 210GS/ E200/ G200	$498/580/868
Sony 19" 420 GS / G400	$838/978
Sony 520 GS / 500 PS	$1388/1598
Sony F400/ F500/ W900	$1488/2878/3088

Viewsonic Monitors

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V75	17"	.28mm	1600x1280	$478
E771	17"	.27mm	1280x1024	$318
E773	17"	.25mm	1600x1280	$398
G773	17"	.26mm	1280x1024	$428
PF775	17"	.25mm	1600x1280	$518
PS775	17"	.25mm	1600x1280	$498
E790	19"	.26mm	1600x1280	$548
PF790	19"	.26mm	1600x1280	$748
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PT795	19"	.25mm	1800x1440	$1098
G810	21"	.26mm	(-US$100rebate)	$988
P810	21"	.25mm	1800x1280	$1218
P815	21"	.25mm	1800x1440	$1298

LCD PANEL

NEC 400V 14" / 1500M 15	$1128/1068
NEC 1510 15"/ 1810 18"	$2068/4888
Panasonic PanaFlat LC50s 15"	$1748
Samsung 530 TFT 15	$1560
Samsung 700 TFT 17"	$3638
Sony LCD L150 15"	$2198
Viewsonic L700 15"	$1468
Viewsonic VPA 150 15"	$1638
Viewsonic VPD 150 15" (digital)	$1638
Viewsonic VP 181 18"	$Call
Viewsonic VPD 180-AGP 18" (digital)	$Call

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Acer 181 ISA / 201 PCI 10BaseT Combo	$28/28
Acer ALN-325C 10/100 PCI Card	$28
D-Link DFE 530TX 10/100 PCI Card	$28
Intel PILA 8460B Pro100 10/100 PCI	$78
Intel PILA8470 Server Adapter 10/100	$145
SMC 1660T ISA/ 1208T PCI 10BaseT	$35/35
SMC 8416T ISA/ 8432 PCI 10BaseT	$63/63

10 BaseT Hubs

Compex 8-RJ45 + 1 BNC 8 Port Hub	$60
3COM 3C16440 SS II Entry Hub 12 Port	$220
3COM 3C16441 SS II Entry Hub 24 Port	$348
3COM 3C16671A SS II Hub 10 24 Port	$1288
3COM 3C16700 OfficeConnect 8/TPO	$108
3COM 3C16704 OfficeConnect 4/TPO	$78
D-Link DE-805 TP/C 5 Port Hub	$88
D-Link DE-806 TC 8 Port Hub	$88
D-Link DE-812 TP+ 12 Port Hub	$205
D-Link DE-816 TP 16 Port Hub	$228
D-Link DE-824 TP 24 Port Hub	$345
Intel InBusiness SH10T 5 Port Hub	$72
Intel InBusiness SH10T 8 Port Hub	$98
Netgear EN104TP 4/ EN108TP Port Hub	$45/65
SMC 3605T 5/ 3608T 8 Port Hub	$55/82

MS Windows NT

NT Server v4.0 CD w/5 Clients Lic.	$1088
NT v4.0 Client Access Lic	$48
NT Server v.4.0 upgrade w/5 Clients Lic.	$450
NT Workstation 4.0 CD	$288
BackOffice Small Business Server v4.5 w/5	$2020

Network Cables

10/100 BaseT Cable 10/25/50/100ft	$8/15/25/38
10/100 BaseT Cable Bulk per ft / per 1000ft	$.30/108
Crimping Tool: RJ45/ BNC	$25/30

100Mbps Hubs & Switches

3COM 3C16750 OfficeConnect 8 Port 10/100BT	$320
3COM 3C16751 OfficeConnect 16 Port 10/100BT	$465
D-Link DFE-905 4 Port 10/100 Hub/Cable/2x NIC	$160
D-Link DSH-8 10/100 8 Port Hub	$218
Intel InBusiness SH100TX4 4 Port Hub 100	$148
Intel InBusiness SH100TX8 8 Port Hub 100	$280
Intel InBusiness SH101TX8 8 Port Hub 10/100	$388

Switch

3COM 3C16981 SS-II 10 Switch 1100 12 Port	$855
3COM 3C16950 SS-II 10 Switch 1100 24 Port	$1366
3COM 3C16981 SS-II 100 Switch 3300 12 Port	$1598
3COM 3C16980 SS-II 100 Switch 3300 24 Port	$2628
D-Link DL-SS-5+ 5 Port 10/100 Switch	$178
D-Link DL-SS-8 8 Port 10/100 Switch	$[illegible]
Intel InBusiness SS101TX8 8 Port Switch	$348
Intel Express 410T 10/100BT 12 Port Switch	$[illegible]
Intel Express 410T 10/100BT 24 Port Switch	$1188
Netgear FS104 10/100BT 4 Port Switch	$238
Netgear FS108 10/100BT 8 Port Switch	$278

Server/ Network Tapes

Exabyte Eliant 820 14G Int/Ext.	$1868/2248
HP 8GB Int / Ext DAT Drive	$998/1188
HP 24GB Int / Ext DAT Drive	$1388/1550
HP DLT 40GB Int / Ext Drive	$2928/3228
Seagate 8GB TR-4 Int. IDE/SCSI Tape Drive	$328/398
Seagate 8GB 4mm DAT Int/Ext SCSI Drive	$788/968
Seagate 24GB 4mm DAT Int/Ext SCSI Drive	$1048/1228
Sony SDT 7000 Int / Ext 4-8GB DAT	$970/1180
Sony SDT 9000 Int / Ext 24GB DAT	$1318/1500
Onstream 30GB IDE/SCSI Int. Drive sw incl.	$388/550
Onstream 30GB Para/SCSI Ext. Drive sw incl.	$558/788

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BackUPS Pro280/350/420/650	$200/250/330/400
BackUPS Pro 1000/1400	$535/688
SmartUPS SU420/SU620/SU1000	$360/435/715
SmartUPS SU1400/SU2200/SU3000	$830/1310/2078
Professional Surge Arrest 7/Tel	$43/54
Network Surge Arrest 7/Tel	$51/65

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- Fujitsu **6.4G** Hard Drive
- Creative **5X DVD** ROM Drive
- Sound System, Speakers
- Logitech **Cordless** Internet Keyboard & Mouse
- 2 **USB** Ports
- 10/100 Network Card
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TPI1452	C366	64MB	4.8G	DVD	56K	14.1TFT	$3,195
TP390X	PII 400	64MB	6.4G	24x	56K	14.1TFT	$4,199
TP600X	PIII 500	64MB	12G	DVD	56K	13.3TFT	$5,599

Monitor

Acerview 15" 54e .28mm	$205
Acerview 17" 77e .27mm	$319
Impression 19" .26mm	$495
NEC 17" AS700 .27mm	$359
NEC 17" FE700 .25mm	$429
Optiquest 19" Q95 .26mm	$539
Samsung 15" 550S .28mm	$189
Samsung 17" 750S .27mm	$299
Sony 210GS 17" .25mm	$429
Sony 420GS 19" .25mm	$849
Viewsonic 17" E771 .27mm	$315
Viewsonic 17" E773 .25mm	$389
Viewsonic 17" PS775 .22mm	$499
Viewsonic 17" PF 775 .25mm	$499
Viewsonic 19" E790 .26mm	$539
Viewsonic 19" PS790 .25mm	$699

Scanner

Canon 320P* ($50 rebate)	$85
Canon 620p/ 630u	$189/189
HP 3300C/ 4200C	$209/265
HP 5200C/ 6200C	$365/519
MAG color Flat Bed	$85
Mustek 600CP/600USB	$99/115

Hard Drive

Fujitsu 6.4GB Ultra DMA	$149
Fujitsu 10GB Ultra DMA	$169
Fujitsu 13GB Ultra DMA	$189
Fujitsu 17.3GB Ultra DMA	$219
Fujitsu 20GB Ultra DMA	$245
Fujitsu 27GB 7200rpm	$349
Quantum 13GB KX 7200rpm	$235
Quantum 20GB Ultra DMA	$255
Quantum 20GB KX 7200rpm	$299
Quantum 27GB KX 7200rpm	$365
IBM 4GB UW SCSI	$245
IBM 9GB U2W SCSI	$429

Backup Device

Acer 2x2x6 CD Rewriter	$189
Mitsumi 4x4x24 CD Rewriter	$255
HP 8200i CD Rewriter	$299
Yamaha 8424 SCSI/ w/int	$409/459
CDR Media 10Pk	$15.99
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Image editing's front five

Continued from page 32

manipulation program for its combination of powerful bitmap processing capabilities and great ease of use
Pros: It is easily one of the most powerful yet intuitive photo manipulation programs
Cons: Needs to incorporate Cumulus Desktop or a photo album more closely into interface
Out of box: Good printed user guide, mouse-over hints, and "what's this?" help tool eases learning. Built in tutorial is top notch

Corel Photo-Paint is to image graphics what Java is to programming languages. In other words, Photo Paint makes advanced and complex photo-manipulation features much more accessible with its many graphical user interface (GUI) features

For example, for all colour corrections and effects/filters, Photo Paint offers three previewing modes: full screen, large thumbnail, or before and after comparison thumbnails. These preview modes are very helpful and speed up the process of selecting the right effect or colour correction setting.

Likewise, the six masking tools and the convenient property bar settings expedite selecting the correct portions of an image for masking purposes. Again Photo Paint dockers for key dialogues offer users the convenience and choice of stand alone settings dialogues, like the objects list or brush settings, or a tabbed rollup docker window at the side of the canvas

All of the controls have icons and layouts that make their operation more intuitive. For example, whenever an angle can be set, Photo-Paint uses a rotor control or allows the user to directly manipulate an icon. Thus, in the case of the lighting effects, users can directly manipulate the lighting cone as well as a rotor control to set a lamp's lighting direction

But Photo Paint doesn't stop at just making image manipulation more convenient. It offers top notch brushes, effects, layering, masking, paths and other features for creating graphics and manipulating photos

This version of Photo Paint offers a new set of about two dozen effects ranging from quilt to swirl. It has new brush settings that start to rival the canvas brush interactions available in MetaCreations pre-eminent tool, Painter 6. And of course Photo Paint has enhanced built-in movie or animation capabilities, so users don't have to rely on standalone animation applications like JASC's AnimationShop

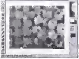
As with Adobe Photoshop, it was hard to pick three of Photo Paint's many outstanding technical features, but here is our trio of favourites

1 Three preview modes (full screen, large thumbnail, comparison thumbnails) are very helpful for making colour corrections and adding effects.
2 Three appealing utility features include new drop shadowing of objects, lighting effects, and the brush settings docker
3 Three ways to control transparencies include transparency tool, transparency masks, and a simple inter-layer transparency setting

In conclusion, Adobe and Corel (and perhaps the re-invigorated MetaCreations Painter) vie for the top spot in image graphics and photo manipulation. Given a roughly comparable price/performance, choose Photoshop 5.5 for technical refinement, Painter 6.0 for the natural media look, and Photo Paint 9.0 for intuitive and speedy operation. A new version of Photo Paint, the Digital Camera edition, was released as we went to press. It has a very attractive first purchase price of $129 and some nifty new features, but we'll have to wait for a full review at a later date

Rating 4.5 out of 5.

JASC PaintShop Pro 6
From: JASC Software Inc
Tel 612-930-9800 http://www.jasc.com
Street price: $145



Overview: JASC PaintShop Pro is shareware application that has graduated to the bitmap big time with its blend of value and utility
Pros: Good balance of editing features and intuitive operation. New auto-rollups and vector draw features add to convenience
Cons: Does not have all of the functional finesse of Adobe Photoshop or Corel Photo Paint.
Out of Box: Very easy to install. It is supported by a succinct user guide with good getting started and very useful "what's-this?" cursor help

JASC may have hit the photo-manipulation sweet spot with PaintShop Pro, even though it is no match for the top two programs—Corel Photo Paint 9.0 or Adobe Photoshop 5.5. In fact if you examine all of the features of PaintShop Pro, they are no stand outs when compared to the natural media brushes of MetaCreations Painter 6.0 or the numerous, nifty art effects of Microsoft's PhotoDraw 2.0

Well, I correct myself—there is the notable exception in the form of PaintShop Pro's outstanding built-in picture album. But for core image processing, JASC has tended to follow rather than lead.

In the latest version, however, JASC has departed from its traditional convenience/affordability niche and added some of its own innovations to PaintShop Pro. Some are so good they will be honoured by the industry and copied by the elite competitors

Take PaintShop Pro's auto rollup dialogues. As every digital artist knows screen space is at a premium when working on an image. Tabbed dialogues, dockers, and floating personal tool bars are some of the innovations graphic programs have come up with to save screen real estate. To these, PaintShop adds auto rollups

As soon as you are finished working with an auto rollup dialogue—by starting to work on the picture itself, for example—the dialogue automatically rolls up and appears as a title bar on the screen. If you want to access the dialogue again simply hover the mouse over the title bar and it pops open. Very handy. I wish more than the current three dialogues (layers, tool options and histogram) employed this feature.

Another PaintShop Pro innovation is the creation of three types of layers: a bitmap image or raster layer, an adjustment layer and a vector layer for solid curves and text. Other graphics applications have variations on this with masks, floaters, lenses, channels, paths and other layers. But JASC is confirming a trend started by Deneba, MetaCreations and Wright Design: the move to three major types of layers and the consolidation of the control of those layers in one place (Adobe currently uses separate controls for channels, paths and layers, and Corel uses separate controls for channels, layers and lenses). By placing control in one place, PaintShop Pro offers a simpler and easier-to-use interface.

Thus PaintShop Pro deserves its reputation for well thought out functionality. JASC's high out-of-box rating is well earned. Installation is easy and the "getting started" part of the user's guide is not only a good introduction to PaintShop Pro but also to some of the basics of colour and graphic design theory

One of many nice touches is the "what's this?" cursor help. Not sure what a button or toolbar feature does? Just click on the question mark icon, then click on the unknown button or slider and PaintShop Pro will flash up the associated help page

Selecting our three favourite features of PaintShop Pro was easy. They are:

1 The built in photo album browser makes managing and editing your images easy
2. New layer control brings objects, adjustment masks and vector layers into one convenient control
3 New vector drawing curves and surfaces including linking text to a curve path

In summary, PaintShop Pro offers a good balance of colour correction, picture transformation, masking and layering features ►

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along with a fairly intuitive interface. So combined with the included AnimationShop, PaintShop Pro provides a very affordable and usable tool for Web graphics business/catalogue imaging and now fine illustration

Overall rating 4 2 out of 5

Microsoft PhotoDraw Version 2
From Microsoft
Tel 905 568 0434 http://www.microsoft.com
Street price $192

Pros It has some of the richest effects and tools more power to manipulate objects and is better integrated with other Microsoft Office 2000 programs It's a good tool for quick photo touch ups

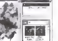
Cons Two steps away from being a great program—it lacks a full set of masking and colour correction tools

Out of box Reboot install a fair getting-started manual Intuitive to use several helpful wizards for interfacing to scanners cameras

Microsoft PhotoDraw 2 0 draws upon the rich set of tools and effects provided in its predecessor program, Image Composer to create one of the easiest and most versatile programs for photo manipulations and/or touch ups PhotoDraw is now faster (but still slow when saving files and performing some object operations) bug free and more tightly integrated with Microsoft Office 2000 programs like FrontPage, PowerPoint and Publisher This latter feature is quite helpful for creating new templates, buttons, and images for all three programs while retaining their colour and style standards.

The frustration of using PhotoDraw however is having powerful colour, 3D designer and distortion effects available but not having the means to apply them effectively by using masks on a portion of an image Likewise it has good colour and lighting controls but to employ them selectively can require the use of complex cutouts and layers.

On the other hand PhotoDraw provides some state-of the-art tools for combining vector and bitmap drawings including cutouts autoshapes and Bezier curves that can be merged with precise opacity controls into a background image In fact, I find that I can literally flit back and forth between a base system (either Photo Paint or PaintShop Pro) and the special effects and cutout tools of PhotoDraw So again it is not hard to choose three favourite features

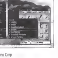


1. The more than 200 designer effects with two to four additional setting controls, allow any painting style to be applied to an image
2. Nine convenient touch up routines from fixing red eye to dust removal are ready to go
3. Nine more Web effects and functions such as rollovers and GIF animations

If Photoshop is the Jekyll and Hyde of image graphics, Microsoft PhotoDraw is the Lurch It has hundreds of effects shortcuts and retouching routines that are downright useful if not unique and essential But its performance, although improved, still lurches. And the lack of masking tools and sophisticated colour corrections and modes keep PhotoDraw from the top rung of image graphics.

Rating. 3 5 out of 5

MetaCreations Painter 2



From MetaCreations Corp
http://www.metacreations.com
Street price $513

Pros This company invented natural media look and feel and its creative brushes and interaction of media are unmatched New interface is much easier to use

Continued on page 48

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Image editing's front five

Continued from page 46

Cons: This program's Mac origins show: hover hints, right-mouse button and cue card help are not available. Out of box: Easy to install. Adobe Acrobat help file is the exact match of the excellent printed user guide. However, there is no tutorial or getting-started manual.

MetaCreations' Painter used to be in a position similar to Microsoft's PhotoDraw: possessing outstanding natural media-like brushes and effects but having an arcane system of floaters and plugin objects for layering and masking. Unlike PhotoDraw, MetaCreations changed all that in Painter 6.0, which now uses standard layers and masks (which convert to Adobe-compatible layers and channels when an image is saved into Photoshop's PSD format) with some unique added twists.

For example, an icon on the status bar allows selections/masks to be universally turned off, turned inside on, or turned outside on. This is very handy when a mask is not quite right and you need to touch up outside the mask, then quickly switch back. Likewise, visibility masks are available for every layer and can be created by choosing one of a simple set of operations like colour luminance. And the visibility mask itself can be edited using the same tools used for editing images.

The other major part of Painter 6.0's makeover is a new set of control dialogues that expand and contract like directory trees in Windows Explorer. This makes getting at the many brush, object, and effects settings much more manageable. With the last few versions of Painter, I welcomed the new features with some trepidation about how to access the controls. That has changed with Painter's new control dialogues, which are all stacked neatly together.

But the real pleasure of working with Painter is its natural brushes, which emulate airbrushing, chalk, watercolour paints, and other natural media with uncanny fidelity. Now airbrushing reflects the effect of tilt (brush angle), bearing (directions of brushing), flow (wheel settings based on use of Wacom's Airbrush Stylus or other pressure sensitive tablets), and pooling (accumulation of paint when the brush is held stationary).

Impasto or depth effects can also be emulated more closely. And the interaction of existing colours/paint on canvas with the current brush is enhanced with new/expanded bleed, dryout and feather settings. And new brush loadings allow multiple colours and better brush/canvas interaction to be assigned to a brush. The results are dazzling. Our three favorite features are:

1 Integration with pressure sensitive tablets from Wacom, and others, for emulation of natural brush effects is still the best.
2 Brush controls are the strongest in the business, which means making your own tools is as easy as can be.
3 The dozens of included template brushes allow you to create any natural or unnatural looks out of the box.

In sum, MetaCreations has really cleaned up the brushes in Painter 6.0, and in doing so, revitalized the whole program. And to boot, the developers keep adding to the Web features, including auto-creation of JavaScript rollover buttons, auto-sectioning of large Web graphics, animated GIF enhancements, and more.

Perhaps the most welcome and refreshing change, however, is the stability in the code. The last two versions had the worst record by far of all the graphics programs I've used: six crashes in an eight-hour editing session. Painter 6.0, in contrast, has been rock solid (but I am keeping my fingers crossed). In sum, Painter is back at the top because of its mastery of graphics media, while offering all the power and convenience of masks and layers. The new interface makes it considerably easier to use, though it truly is Mac oriented with its lack of Windows functions such as right mouse button activation and hover hints.

Rating. 4.3 out of 5.

Comparative analysis

A lot of readers may wonder what the incremental benefits of the five products just discussed are, when compared with lower-priced or freebie software (packages that come bundled with digital cameras and inkjet printers, for example). Here is a list of the functions you'll probably get with a freebie program.

1 Picture cropping and maybe transformation features (e.g., rotate, skew, flip horizontally and vertically).
2 Colour correction for brightness, contrast, hue, and possibly saturation and luminance.
3 Simple brushes for touch ups; that offer zoom in and out views.
4 Possibly masking and selection tools that allow for fine control of colour correction and brush ups in portions of a picture.
5 Likely a text tool for adding captions and messages.
6 Some combination of packaged functions like card or calendar making, and Web button and/or GIF animations.

Here is what the programs reviewed in this article add to the list.

1 Many more options for image transformation and colour corrections—most of which are easier to use.
2 Ability to mask a portion of a picture to selectively apply brushes, correct colours, and apply effects and transformations.
3 Dozens of predefined brushes and effects, which can be further tweaked with settings and options.
4. The ability to combine several pictures using layers with user-customized transparency for collages and composite images.
5 Assigning text to a curved path, plus the ability to adjust properties like colour, type, angle, and size to sentences, words, and/or individual letters.
6. Support for more output options, including saving in various compressed files formats, outputting to many more devices, and offering more layout formats.
7 Many more Web options, including optimized file compression, transparency control, buttons/menus/rollovers, and more.
8 Scripting or macros that allow for complex undos, unattended batch operation on huge files, and user programmable effects.

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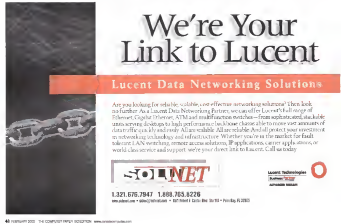

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Revised Photoshop holds new tricks

By Nathan Segal

Adobe has done it again re inventing Photoshop. And this new version 5.5 is more than just an upgrade it comes with the latest version of ImageReady, a tool for preparing images for the Web. Because Photoshop and ImageReady were so complementary, users lobbied Adobe to combine them. As a result, ImageReady 2.0 is now only available as a Photoshop component not as a separate application.

Photoshop 5.5
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Tel 800 492 3623 http://www.adobe.com
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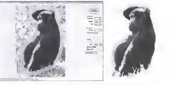
Adobe has redesigned the Web graphics preparation interface essentially consolidating the entire process so everything takes place within one huge dialogue box called Save for Web. Using the LiveView panels available in Photoshop or ImageReady, you can view your images with up to four variations. Choose from GIF JPEG PNG 8 or PNG 24 file formats and compare quality file size and download time. Using the new Lossy GIF feature you can incrementally set the GIF size. All optimization controls exist here including Colors, Dither Matte, Format Image Size Loading Speed and more.

Photoshop 5.5 is now closely integrated with ImageReady 2.0 and both applications can be installed at the same time. "Jump to" buttons on the toolbars make it simple to switch between the applications while working on the same file. Clicking on the button in Photoshop immediately saves the current file and opens it in ImageReady, and vice versa. Even better all edits in the prior application can be removed in the History palette. In this release, Adobe has built all of the main Web export features into Photoshop itself while ImageReady contains basic retouching capabilities. This feature minimizes the amount of jumping necessary.

New features in ImageReady

ImageReady offers features like Image Slicing JavaScript Rollover Effects and bundled animations. When using Image Slicing, you can divide the image as you see fit then ImageReady will write the necessary HTML code automatically. The Rollover feature will also write the JavaScript code. At a later date, you can update the HTML code for a sliced image. At the beginning and ending of its HTML coding ImageReady embeds comments so it can automatically find and replace that code.



Photoshop 5.5's Edge Highlighter tool is applied to an image (left). While some background edging remains on the resulting masked image (right)—which can be cleaned up in seconds—the main body and highlights of the fur were masked quite well. The image shows partially transparent edges resulting from removing some background colour from the image

Animation

As in the previous version developing an animated sequence is a straightforward process. You create a multi layered file or open a previously saved one. The next step is to create frames or edit the layers within ImageReady. You can make changes to the layers such as opacity and special effects and these occur in each frame. The Tween feature allows you to quickly create new

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Revised Photoshop holds new tricks

Continued from page 49

frames and create the illusion of a single element in a frame moving or fading in or out. You can also set a delay for each frame.

Masking features

Adobe has included three new ways of masking images. They are Magic Eraser, Background Eraser and the Extract Image command. The Magic Eraser tool automatically erases all similar pixels to transparency. You can choose to erase contiguous pixels only or all similar pixels on the current layer.

The Magic Eraser tool is grouped with the eraser tool in the toolbox. Options with this tool include Tolerance, Opacity, Use All Layers, Contiguous and Anti Aliasing.

The Background Eraser tool is dragged throughout an image to erase pixels. The different options, such as Sampling, Tolerance, Contiguous, Discontiguous and Find Edges, allow you to control the amount of transparency and sharpness of its boundaries. This tool works well with a drawing tablet.

The Extract Image command is especially useful for tough to mask images like wind-blown hair and leafy trees. It works in a very intricate way and allows you to isolate an object from the background with a minimum of effort. When using the Extract Image command you must work in a layer. It is recommended that you make a copy of the working layer when using this command. I was very impressed with the results. It made it possible to create a complex mask—that previously may have taken me hours to do—in a few minutes.

Both the Background Eraser and the Extract Image command remove a certain amount of background colour of the remaining edge pixels, making them partially transparent. This makes compositing relatively seamless and reduces the problem of halos around images.

Art history brush

With the Art History Brush, you can paint with stylized strokes, using the source data from a specified period. Using the various options of paint style, fidelity, size and tolerance, you can simulate the texture of painting with different colours and artistic styles. Choose from curling lines of different lengths, opacity, blending and dabbing to create new effects on your image.

Layer effects

Both Photoshop and Adobe ImageReady support Layer Effects, where you can apply a number of automatic

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Image editing's front five

Continued from page 48

In short, the five programs featured in this roundup uniformly bring a new level of ease of use, speed, and sophistication to image processing. Selective masking plus sophisticated colour corrections and effects, for example, can rescue many images that otherwise would have to be reshot or would never be shown. Likewise, masking and layering can speed up composition and layout of ads, brochures, and illustrations for reports and manuals. Finally, on a personal note, I make my own Christmas cards, presentation backgrounds and illustrations for users guides and Web sites using these tools.

What you don't get with the front five

As noted at the outset, each of the programs specializes in key areas. For example, MetaCreations Painter and now Corel Photo Paint provide sophisticated canvas-brush interaction for colour and secondary natural effects, like bleeding, pooling or smearing.

Likewise, Adobe, Corel and Microsoft PhotoDraw are the first to supply 3D effects including projecting onto simple 3D surfaces. But this is still primarily the domain of 3D rendering programs like MetaCreations Poser. Even 2D effects, such as embossing, bevelling, paint smears and other large scale surface treatments beyond paper textures, are just beginning to emerge in the above programs.

Automatic animation sequences using start and end point images with highlighted actors being changed/moved along from scene to scene, or cell to cell, are still the domain of specialized professional animation and movie programs.

A final thought. In a word processor you have spelling and grammar checkers, but there's no such thing (yet) as an image grammar checker. So, even though these programs give today's graphic artists infinitely more tools than those available to Leonardo Da Vinci, there's no guarantee they'll be able to create a masterpiece. ❑

Jacques Surveyer is a consultant and writer. You can see if his images are worthwhile at http://www.inforamp.net/~jbsurv

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Cataloguing your digital images

By Jacques Surveyer

Image cataloguing software is inexpensive and often included when you purchase a digital camera, scanner or graphics software. It can be quite handy, helping you keep track of an ever-growing bank of images from digital cameras, Internet downloads, and Web development work.

Have you ever run into products you would like to like but just can't quite because they keep zapping you with little foibles or quibbles? Well photo catalogue/album software is such a category. The four programs we look at in this roundup have a lot of nifty but not fully developed features.

Perhaps I'm too finicky but here is what I want from an image cataloguing package:

- The ability to generate thumbnail size (about 80x60 pixels) views of a directory of mixed image files
- The generation must be fast: 120 images (average size 250KB) per minute or better on a system powered by a 166 Mhz Pentium processor. This corresponds to the rate at which Paint Shop Pro 5.0 does catalogue scans
- It must be able to scan a variety of formats—at least 30 vector, bitmap and other file types.
- It must be able to set up the catalogue with the following parameters: what info will be scanned into the database along with the image thumbnails, pixel size of thumbnails, what directory the catalogue will be stored in, and what filetypes will be scanned into the catalogue
- The ability to drag and drop images to and from the catalogue
- The ability to query the catalogue, with the results that meet the query criteria appearing as thumbnail images

Now let's see if the different photo album software currently available meet our criteria. In this review we looked at the following packages:

Canon Photo Org 1.0
From: Canon Software Publishing
http://www.software.canon.com
Suggested retail price: US$29.95
(US$49.95 minus US$20 mail in rebate)
Included with most of Canon's BJC colour inkjets

Canto Cumulus Desktop LE 4.02
From: Canto Software
Tel: 415 905 0300 http://www.canto.com
Price: Included for free with CorelDraw Suite 8

CQuick Showcase 3.0
From: CQuick Technologies
Tel: 206 427 1067 http://www.cquick.com
Street price: $69.95

ACDSee 2.41
From: The ACDSee Systems
Tel: 800-414 2237 http://www.acdsystems.com
Street price: $60

We also looked at PhotoZone from Canadian developer Vorton. With it one can quickly assemble a photo album, but only for viewing or display. Users can't drag and drop images from the album, or easily copy or move an image to another program or directory once it is in the album so this product is not included in the comparative review.

Catalogue creation basics

The other programs reviewed here can all autoscan and create thumbnails from a directory of multiple filetypes. But the speed of scan was quite variable. ACDSee is the fastest by far, while Showcase scans at more than twice our desired speed of 120 images per minute. Canto Cumulus and Canon Photo Org fall well short, scanning at only 25 percent and four percent, respectively, of the desired speed.

The speed of processing may not initially seem like a major concern if the result is a handy searchable catalogue, but many such programs have become shelfware because of the very slow load and redisplay times of their thumbnail albums. Fortunately the programs in this roundup appear to have pretty fast reload and display times once the catalogue is loaded—Cumulus and Showcase are extremely fast.

When it comes to number of filetypes the program can store, Cumulus tops the list with its ability to store all but one of the formats on my list list. In contrast, Showcase handles about two-thirds

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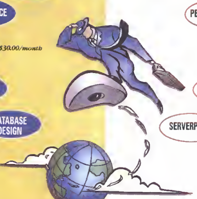

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PhotoSuite III combines ease of use with nifty effects

MGI Software has built on its early versions of PhotoSuite to create a very slick consumer graphics program that manages to walk the line between ease of use and being over-simplified. PhotoSuite III is a fairly powerful image editor with the usual assortment of tools. Two special effects added to this edition are PhotoTapestry and Auto-stitching, which was added after MGI acquired Live Picture last year.

PhotoSuite III
From MGI Software Corp.
50 W Pearce St. Richmond Hill ON L4B 1E3
Tel 888 644 7638 http://www.photosuite.com
Estimated retail price: $49.95

Auto-stitching is a utility that allows you to join several pictures with overlapping image information into a single large image. It does this by finding the common points in the overlapping portion of each picture, then blending them together so the seams are invisible. The most common application of Auto-stitching is making one panoramic image from several shots of a landscape.

The PhotoTapestry feature recreates an image from a library of tiny photos. The effect is most noticeable when the image is viewed from a distance so that the individual thumbnails shots aren't as visible. The tapestry utility divides the image into a grid and calculates the hue and brightness values from each grid cell & then substitutes pictures of similar values for each cell. When making a PhotoTapestry from a portrait, for example, the subject's blue eyes could be substituted with photos of the sky or other images with similar blue hue and brightness values.

PhotoSuite III interface

PhotoTapestry is similar to the technique used in posters for the movie *Truman*, which was a large photograph of actor Jim Carrey that, upon close inspection, turned out to be made up of hundreds of images from the movie. Obviously a database of photos has to be created from images that vary in colour, hue, intensity, and subject matter. PhotoSuite III has about 1,500 images in its tapestry database.

PhotoSuite III allows users to bring in images from the usual devices (scanners, digital cameras) as well as to organize the resulting files. Common image-editing tasks such as removing a scratch, erasing red eye, or sharpening the image are simplified with this software. It also includes a good assortment of common photo-editing tools.

The package also has some image special effects that allow you to apply distortions to photographs, for example to create a cartoon-like caricature of a person from a photograph.

Some thought has been put into the fact that more and more people will want to publish images to the Web, thus image emailing, automatic saving of images for a Web page, and links to image-sharing pages are included. PhotoSuite III has more than 1,200 templates for greeting cards, magazine covers and other projects. The two-disc program runs on Windows 95, 98 and NT 4.0 (Service Pack 3). This is a very nice looking and well organized program that offers very good features and content for a low price.

— Rod Lamirand

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Cataloguing your digital images

Continued from page 54

while Canon Photo Org supports only half and ACDSee only one third. So far, Canon Photo Org appears to be laggard in the group.

But Photo Org offers two extra conveniences that none of the other programs do: a handy photo editor and greeting-card creator. Many users may like the latter feature, and it offers just a sweet hint of what is possible with more robust packages like Corel Print House or MGI Photo Suite III. The Canon Photo Editor, which pops up very quickly and has a nice range of crop, colour correction and bitmap paintbrush tools, is awfully handy for quick touch ups when reviewing the catalogue of your shots. Alas, the other three products lack such a quick retouch photo editor, although they provide links to external editors via the usual cut and paste operations (ACDSee and Cumulus have links to external photo editors through the menu as well), but it means the nuisance of going through three steps instead of one.

New catalogue not a breeze

I must admit I was really disappointed with the difficulty involved in setting up a new catalogue in all of the programs. I expected a wizard or some other custom dialogue to pop up when I clicked on the New menu item to step me through creating a new catalogue, prompting me for the parameters to configure it to my exact needs. No such luck.

Instead, you have to play around, figuring out how to set up the catalogue without putting any significant number of items into it. Once you have a new catalogue configured properly, you then have to figure how to do a bulk load/import of images. Shame on all the program designers for this wasteful inconvenience.

Drag and drop

Normally I am not a fan of drag and drop operations because there is rarely a visual cue in most applications that this type of feature is available. Back in the early days of Mac and Windows, a de facto standard of the cursor changing to a grasping hand when it hovered over a drag and drop object seemed to be emerging. But most newer programs are no longer so intuitive. You only learn the application's deep dark drag and drop secrets if you've gone through a tutorial, read the owner's manual, or by accidental discovery. In an era of electronic only documentation, drag-and-drop features simply get missed.

When creating Web pages—with their dozens of graphic images and other media files, from buttons to toolbars to thumbnails, to picture text and rollovers—drag and-drop is a true convenience. Notably, Cumulus appears to have drag-and-drop support for all the major graphics and Web development programs. This is a feature the other programs would do well to imitate.

Continued on page 60

Photo catalogues: What they read

Filetype	Canto Cumulus LE	Canon Photo Org	CQuick Showcase	ACDSee
ai (Adobe Illustrator)	yes	no	no	no
aif (Audio sound)	yes	no	no	no
avi (Windows movie)	yes	no	no	no
au (sound clip)	yes	no	no	no
bmp (Windows bitmap)	yes	yes	yes	yes
cmp (Lead utilities format)	yes	yes	yes	yes
cmx (ClipArt metafile)	yes	no	no	no
cdr (CorelDraw format)	yes	no	no	no
eps (Encapsulated PostScript)	yes	yes	yes	no
fax (Fax)	no	no	yes	no
fpx (Kodak FlashPix)	yes	yes	yes	no
gif (GIF bitmap)	yes	no	yes	yes
hgl (HP graphics language)	yes	no	no	no
ico (Windows icon)	yes	no	yes	no
img (GEM image)	yes	no	yes	no
jpg (JPEG bitmap)	yes	yes	yes	yes
mac (MacPaint bitmap)	yes	no	yes	no
mov (QuickTime movie)	yes	no	no	no
mpg (MPEG movie)	yes	no	no	no
msp (Microsoft Paint)	yes	no	yes	no
pcd (Kodak Photo CD)	yes	yes	yes	yes
pct (Mac pict format)	yes	yes	yes	no
pcx (Zsoft bitmap)	yes	yes	yes	yes
pdf (Adobe PDF)	yes	no	no	no
png (Portable network graphic)	yes	yes	yes	yes
psd (Adobe Photoshop)	yes	yes	yes	yes
ras (Sun raster)	yes	yes	yes	no
tga (Targa format)	yes	yes	yes	yes
tif (TIFF format)	yes	yes	yes	yes
wav (Microsoft sound)	yes	no	no	no
wmf (Windows metafile)	yes	yes	yes	yes
wpg (WordPerfect graphic)	yes	no	yes	no
Rate of cataloguing images/minute	30	?	300	650
Fields/notes/full image	fixed/yes/yes	fixed/no/yes	many/yes/yes	no/yes/yes
Queries	extensive	simple	extensive	simple

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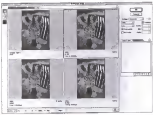

Photoshop 5.5's new Save for Web feature offers four compression options.

Revised Photoshop holds new tricks

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effects to layers Options include Drop Shadows, Glows, Beveling, Embossing and a new Colour Fill effect ImageReady also includes Pattern and Gradient Fill Layer Effects, and sets of one or more layer effects known as Styles Even after being applied, these effects are "live," meaning that they update automatically when the layer is edited

Contact sheets

Contact sheets are a new feature that can be used for record keeping and presenting images to clients. This feature creates contact sheets automatically saving a great deal of time You can even add captions and create multiple sets As an extra touch, you can export Web galleries with thumbnails on a main page with links to your images on separate Web pages.

Observations and recommendations

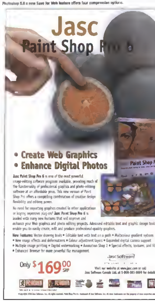
On receiving the software for the Macintosh and PC I set about installing it on both systems. The Macintosh version installed perfectly, but on the PC, the installation failed about two-thirds of the way through, returning a " 106 error " message It took several calls back and forth to Adobe before we discovered that the problem was due to a scratch on the CD-ROM that took place during the duplication process. A temporary solution was to run a custom installation and disable the ICC profiles.

This problem will probably be fixed by the time you see this article. However, if you run into an installation issue caused by a defective CD-ROM, you can contact Adobe technical support at 206-675-6303

Conclusion

I liked the degree of interactivity between Photoshop 5 5 and ImageReady 2 0 but I couldn't help but think that they should be blended into one This would be a logical step that would streamline the Web creation process even further

I was really impressed by Photoshop's masking technology though Artists who have to do a lot of complex masking will really benefit from these new advances, which will save a great deal of time This upgrade is definitely worth the investment. ❑



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Picture It! is included in Home Publishing Suite as is Greetings—a similar, small stand-alone, greeting card program.

The suite is perfect for image editing neophytes those who rarely edit images or those who want the steps made really easy. Project templates include cards, animated email, simple but good looking personal Web pages party hats crafts banners and even finger puppets In fact the three disc program has 10 000 templates designs or messages many of which have been licensed from Hallmark.

Home Publishing Suite interface

PictureIt! interface

The only criticism of this program is that at times it is confining—you are limited to the processes offered.

Picture It! on the other hand allows users to get right down into the details and edit a photograph in whatever way they deem. While it isn't Corel Photo Paint or Adobe Photoshop Picture It! includes real image-editing tools.

Considering that Home Publishing Suite includes both Picture It! and Greetings for only $10 more than Picture It! there seems no good reason to buy the standalone versions.

— *Rod Lamirand*

Cataloguing your digital images

Continued from page 57

Note fields

Finally what is a catalogue without notes and other special fields for descriptions prices or status information. All of the programs reviewed allow user comments for each image.

Cumulus and Showcase take this a step further by including standard fields such as image size creation date and last modified date (which is picked up automatically from directory info). In addition both allow users to do queries based on finding specific values in the fields. The queries then show the images that meet the search criteria.

Showcase then adds more value by allowing users to define their own fields and create storable queries that for example, find all images marked "WebAsset," created after March 1998 and whose status is marked "copy ready."

This is very useful, and now you see my dilemma. Each of the programs have at least one very desirable feature that the others lack. But all of them lack simple catalogue creation wizards that I expect from such programs. True, all of have reasonable catalogue usage features, however two programs lead the parade. Showcase shines for its speed and querying capabilities, and Cumulus for its wide support of filetypes and drag and drop ease of operations.

No single program stands out for overall features and convenience, but each has some very useful functions that will help you keep your images organized. ❑

Jacques Surveyer currently is doing Web development and charts graphics at http //www.inforamp.net/~jsurv

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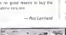

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Sun's McNealy still strong on networks

LAS VEGAS (NB)—It had been two months since Scott McNealy, chairman and chief executive officer of Sun Microsystems Inc., gave a keynote address in Las Vegas, and it was evident that neither the passage of time nor the holidays had diluted his sense of humor or his dislike of anything based on the Windows operating system

McNealy was back in Las Vegas to give what the organizers of Consumer Electronics Show (CES) 2000 billed as the Executive Perspective Keynote What his audience heard was how Sun Microsystems, alone and in partnership with others, was responding to the "real opportunity" of the Internet, the networking of things

"The world is filthy with things," McNealy said, adding that there were many times more things in the world than people But these things (other speakers would have referred to them as devices or appliances) need to be able to communicate with each other, he said To do that, they need to speak the same language a language that McNealy guaranteed his listeners, "won t be CE."

McNealy, whose company is the developer of the program tools Java and Genie, said his vision of the future is, as it has been for several years, that every man, woman, and child is connected to broadband anytime and anywhere they are And he made it clear that he expected Sun Microsystems to provide this capability

But McNealy warned the network environment of the future will be very different from what it is today One reason he gave for this is that most of what goes into computers today is too "fat" to be of use in Internet enabled devices.

The reason why size matters to McNealy is that he envisions tiny objects, such as sensors located in automobile tires that would tell the driver when they were about to wear out, or when air was needed Or in light bulbs to tell when they needed to be replaced.

And McNealy, only half jokingly, talked about putting locater chips into children, or their car keys, so that parents could monitor their activities.

Another reason why McNealy's future network environment will be very different is that things will be given away for free. McNealy said that he really didn t care who owned his refrigerator or television set, all he cared about was the function they performed for him. So he envisions service providers giving network-enabled appliances to subscribers for free in exchange for a monthly contract to provide services such as cold storage or video entertainment.

And should anyone in the audience be skeptical about his almost something for nothing projection, McNealy said that more than $1 billion was flowing out of the Silicon Valley each month to companies that have such a program as part of their business models

Betting against the network would be a bad bet, McNealy said. To prove his point he announced that Sun Microsystems had entered into agreements with GTE, Cisco Systems Whirlpool Sears, and Connected Family (a vendor and delivery service of online purchases) to form a service oriented network whereby a Whirlpool washer that needed to be fixed would run a self diagnosis program, transmit that diagnosis by GTE broadband over infrastructure hardware made by Cisco Systems to a Sears repairman who would show up on the consumer s doorstep to correct the problem

McNealy closed his remarks with some advice for each segment of the consumer electronic industry He advised manufacturers that anything they make if it has a "digital or electronic heartbeat" it must have interconnectivity built in

Content providers were told that any content they produced must be Web-enabled. And consumers were told to look for and purchase Web-ready products, but that in doing so, they should not buy anything that came with a manual, as that product was too complex. All instructions needed to operate any Web-ready product should, if necessary at all be available on the Web

And to anyone engaged in staying ahead of the technology curve he said, "You don t have to outrun the bears just the other hikers." ❑

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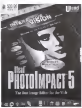
Ulead tools focus on Web graphics

PhotoImpact 5.0 is priced like an entry-level graphics program, but feels more like a professional package. For one thing, unlike entry-level graphics software such as Microsoft Home Publisher, PhotoImpact 5.0 doesn't significantly simplify its interface. This isn't to say it's hard to use. For anyone familiar with CorelDraw's menu interface, it is quite straightforward.

PhotoImpact 5.0
From: Ulead Systems
970 W. 190 St., Torrance, CA 90502
http://www.ulead.com
Estimated retail price: $119



PhotoImpact 5.0 uses drop-down menu items and a taskbar format. This may make some users a tad more anxious, however for anyone who intends to use the software more than occasionally, the benefits are clear: they are not limited by the canned steps typical of entry-level graphics programs.

This version of PhotoImpact expands and improves the extensive toolset found in the previous version. It is also more Web oriented than any other low-cost graphics application.

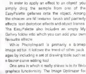
Everything you usually find in an image editor—such as cloning, colour correction and multiple file format support—is here, and more. The list of effects is impressive. One of the coolest usability features is the EasyPalette, which presents a separate window containing text and image preset effects arranged in folders called "galleries."

In order to apply an effect to an object, you simply drag the sample from one of the EasyPalette galleries onto the object. Among the choices are fill textures, brush and painterly effects, text distortion effects and object frames. The EasyPalette also includes an empty My Gallery folder into which you can add your own favourite effects.

While PhotoImpact is primarily a bitmap image editor, it follows the trend of other packages by including a set of drawing tools such as a bezier curve editing tool.

One area in which it really shines is in its Web graphics functionality. The Image Optimizer, for example, makes choosing the right resolution and file format for your Web graphics easy and includes the ability to preview up to four image formats at once. An image slicer is included, which allows you to segment a continuous image and assign different links to each segment—as a Web navigational map, for example.

A couple of menu-driven utilities called Component Designer and Background Designer simplify the production of Web page graphic items like background tiles or button bars to three steps. You select the component from the menu of predesigned elements, customize it by changing the text or modifying the colour, then finalize the file by sending it to the Image Optimizer or exporting it into the PhotoImpact workspace. Among the Web components you can make with these simple steps are buttons, banners and Java rollovers.



The Java rollover designer allows users to easily create Web page icons that change their appearance. The example we created (above) shows a Books icon in normal view (top), in mouse-over view (middle), then in mouse-click view (bottom). Clicking on the designer's Export To HTML option automatically invokes a script that writes the underlying HTML code to operate the icons.

The Java rollover designer allows you to make rollovers without any Java programming. (For those of us with limited Java experience, a rollover is a Web graphic or button that transforms when a cursor passes over it or when you mouse-click on it.) Included in the templates are about 40 three-icon sets that define the icon in normal, mouse-over and mouse-click states. You can modify the text and the colours as well as the size of the buttons in the second step. In order to complete the rollover, you select the Export To HTML option and the Component Designer writes the necessary coding to invoke the rollover effect.

Also included as a separate utility is GIF Animator 3, which allows you to create new animated GIF sequences or to edit existing ones. Included as part of the clip art collection are more than 400 GIF animations.

JavaRazor 1.0
WebRazor Pro 2.0
From: Ulead Systems
Estimated retail prices: $100 (Java), $140 (Web)

Ulead Systems also makes a couple of Web-specific applications called WebRazor Pro 2.0 and JavaRazor. JavaRazor contains two Java applet designers: the button applet and the animation applet. These also use a menu-driven interface that makes it simple to add Java components to a Web page. For example, the animation applet allows you to add scrolling text boxes to your page.

WebRazor Pro contains four modules: GIF Animator 4.0, Smartsaver Image Optimizer, PhotoExplorer image catalogue and viewing utility, and a 3D text-rendering utility called Cool3D.

—*Rod Lamirand and David Tanaka*

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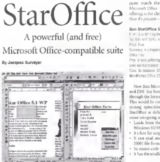
StarOffice

A powerful (and free) Microsoft Office-compatible suite

By Jacques Surveyer



StarOffice interface

Last fall we reviewed Corel WordPerfect Suite 2000, Lotus SmartSuite Millennium 9.5, and Microsoft Office 2000. We found that as far as features are concerned the three Windows-compatible office suites are remarkably equivalent. True, Lotus SmartSuite can't quite match the completeness of Corel WordPerfect Office and Microsoft Office, but it is the easiest to learn and use, while the Corel offering is the cheapest, and Microsoft's has the biggest share—at more than 85 percent—of the market.

Sun StarOffice 5.1
From: Sun Microsystems, 100 Renfrew Dr., Markham, ON L3R 9R6
Tel: 905 477 6745, http://www.sun.com
Price: Free
Summary: A complete suite of free office applications that reads and writes Microsoft Office files
Pros: It runs uniformly in Linux, Solaris, OS/2, as well as Windows 95/98/NT and has solid word processor, spreadsheet and presentation features
Cons: Its database, DTP and Mail/Web features are well behind those of Corel WordPerfect Office 2000 and Microsoft Office 2000

Now Sun Microsystems, the company that brought you Solaris, Java and JINI, has bought the StarOffice Suite and is distributing it for free through the Internet (it can also be ordered on CD ROM for US$9.95). This would be nothing special if StarOffice was a makeshift word processing, spreadsheet, presentations, database suite. But we found that StarOffice is definitely more than that. What makes StarOffice even more intriguing are the following:

- Loads from the same CD ROM onto a variety of OSes, including Windows 95/98/NT, OS/2, Solaris for Sparc/Intel, or Linux.
- It's free for single users or for installing on corporate servers.
- It can read and write Microsoft Office 97 (and even some Office 2000) file formats.
- Its source code is open so developers can easily modify it or add to it.
- It has the smallest disk usage footprint of the main three office suites.

StarOffice is the suite IBM was rumoured to be purchasing but didn't—and should have. Now Sun MicroSystems is using it as stalking horse for its new Sun Ray (call it Java Station 2) network computer hardware. One of the weaknesses of the Java Station shored up by StarOffice is the fact that it provides a server based office suite that is compatible with Microsoft Office file formats.

So, how good StarOffice is will be of interest to Linux and Windows users who are not willing to shell

Continued on page 67

XactCopy mirrors OS for fast recoveries

By Jacques Surveyer

DuoCor's XactCopy provides cheap, simple and remarkably effective disk mirroring and ultra-fast crash reboots for Windows operating systems, from Windows 9x to NT. There will be a Windows 2000 version, but not until 90 to 120 days after the final release date of the new OS. XactCopy can back up just the core operating system directories and files for fast reboot or an entire drive for complete system backup.

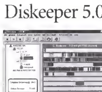
XactCopy
From: DuoCor Inc.
105-101 Providence Mine Rd., Nevada City CA 95959
Tel:530-265-0643, http://www.duocor.com
Price: $103 (Windows 9x), $222 (Windows NT Workstation), $1,029 (Windows NT Server)
Overview: XactCopy provides backups of Windows 9X and NT operating systems for nearly instantaneous reboots. The software requires an extra drive, which XactCopy mirrors and renders invisible to Windows.
Pros: A simple, practical way to do disk mirroring with the added benefit of very fast reboot.
Cons: Requires a second physical disk that is at least equal in size to the Windows directory and sub-directories.

XactCopy works by hiding a second disk from Windows. The hidden drive, which has its own hidden boot record, can then be used to mirror part or all of the operating drive. In the event of a system failure, users just make the backup drive the primary drive and the system boots up as normal with most, if not all files restored from before the crash.

Using XactCopy bypasses the often lengthy tape, secondary storage, or remote hard disk backup process. XactCopy also bypasses the sometimes very lengthy reboot and recovery process required by Windows to restore and ensure integrity of the original operating file system. XactCopy does this by main-

TCP Lab pulls the plug on the latest UPS devices page 71

Diskeeper 5.0 defrags NT systems



By Jacques and Nathan Surveyer

Disk fragmentation is the inevitable wear and tear that happens on your disk drives as you use your computer. Modern applications and operating systems create thousands of temporary files during the course of operation—especially if databases or Web browsing are involved. As temporary files are created and destroyed, disk space becomes increasingly fragmented—a condition in which free space on a disk drive or partition becomes divided into smaller and smaller sectors.

Diskeeper 5.0
From: Executive Software International
701 N. Brand Blvd. 6th Fl., Glendale CA 91203 9791
Tel: 800 829 6468, 818 547 2050
http://www.execsoft.com
Street price: $75 (Workstation), $400 (Server)
Overview: Millions of Windows NT users are without three things Windows 98 users take for granted: universal plug and play capability, power management and simple disk defragmentation. Windows 2000 (previously known as NT 5.0) will take care of the first two. The software—which has been the premier tool to handle disk fragmentation in the past several years—takes care of the third
Pros: Reliable, fast and effective disk defragmenting for Windows NT Server and Workstation
Cons: Takes several passes to do a complete optimization
Out of the box: Easy to install, and graphical user interface is easy to navigate

As a result, files on the system also become broken up into increasingly longer chains of smaller fragments. This in turn has three major consequences: access time to all disk files can increase by as much as 200 percent and an average of 60 percent in our measurements; new file creation is especially affected, taking as much as 350 percent longer; and the possibility of file corruption increases with the length and complexity of cluster chaining.

What Diskeeper does is bring robust defragmenting to Window NT 3.5x and 4.0. This in turn means better system performance. For example, our tests showed that the startup time for Microsoft Word, Powerpoint and Excel declined by one third after defragmenting (see Table 1).

Continued on page 70

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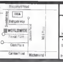

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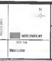

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Aopen 50x/Hyper 50x	$59/$61
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Adaptec U2W	$call
Adaptec 2944 uw Differential	$call
Asus sc 200/875	$call
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WD 8.4GB OEM	$173
WD 10.2GB/13GB	$188/$199
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Maxtor	$274
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Fujitsu 8725	$18
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StarOffice

Continued from page 64

out $200 to $700 for an office suite, and its its competitive implications should also appeal to some of the other major IT players

StarOffice Word

The word processor component of the suite, StarOffice Word, is very impressive in its capability to read a wide range of popular word processing documents, including those created in Microsoft Word (in all its varieties including Word 2000) most WordPerfect varieties, AmiPro (up to version 3.0) and others.

StarOffice Word's features and functionality are right up there with Word and WordPerfect: including columns, frames, images, word wrap, borders, font styling, stylesheets (not quite as versatile as the same feature in Word or WordPerfect), headers, footers, tables, charts, drawings and frames that can contain anything (these do not link as easily). In short, StarOffice Word is a full fledged word processor and then some.

StarOffice Word creates indexes and tables of content with ease. Like Lotus WordPro, it offers consistent and fine control of created objects like frames, borders, drop caps, and charts. But unlike Lotus WordPro, StarOffice Word can be clumsy because you don't quite know where to find those equivalent controls (all office suite vendors would do well to imitate Lotus's use of a tabbed property sheet and Corel's context sensitive property toolbar). StarOffice Word, like most other word processors, uses a right mouse button popup menu, but it offers shared properties like Alignment, Arrangement, and Anchoring. In sum, StarOffice Word matches most word-processing features and goes beyond in functionality, particularly in integrating other suites' components.

But StarOffice Word's ease of use suffers somewhat because of the location of controls is unclear. Overall we'd say StarOffice Word is about 90 percent equivalent to Microsoft Word (though it actually has more functionality in table contents, and drawing) and give it an eight out of 10 rating.

StarOffice Word/Web doubles as an HTML editor. Like its counterparts, it does a workmanlike job of producing HTML documents supporting images, tables, simple stylesheets all the major HTML form elements, and simple framesets. But like its counterparts, StarOffice Word is also hard pressed to maintain the format and styling of word processor documents when converting them to Web pages. Thus, such features as snaking columns, picture frames, text blocks with bordering and drop shadows, drop caps, footers with page numbering—all of which are format features of StarOffice Word/Web—just dropped out or were badly mangled in the conversion to Web pages.

In addition, the link between Web frames and framesets and the regular StarOffice Word/Web editor is a bit Byzantine. But the bottom line is StarOffice lacks critical Web development functionality such as easy frameset editing, site maintenance templates, and other robust Web features of Corel's Trellix and certainly of Microsoft's FrontPage 2000. Overall we'd say StarOffice Word/Web is about 60 percent equivalent to its counterparts, earning it a six out of 10 overall rating.

StarOffice Impress/Chart

The combination of StarOffice Impress/Chart very closely matches Microsoft's PowerPoint or Corel's Presentations in functionality. They have all of the major presentation features: slide view with nine slide types (missing only Org Charts), outline view to quickly type in slides with a convenient preview window, slide sorter view to organize a presentation with scores of animation and slide transition effects (but lacking fine control of animation effects), notes view in and speaker's cues with a thumbnail of the slide as guide, an extra handout view that previews printed slide handouts in layouts of two, three or four slides per page.

In addition, StarOffice Impress/Chart provides extensive drawing and charting that goes beyond what is directly available in either Microsoft PowerPoint or Corel Presentations (but not equal to what is available in programs like Microsoft PhotoDraw or Corel PrintOffice).

In short, the combination of StarOffice Impress/Chart is impressive in its presentation capabilities. It includes the ability to read PowerPoint 2000 slides (but not any Lotus Freelance nor Corel Presentations slides). However, there are some glitches on import—PowerPoint Graphs and Org Charts are rendered as non-editable graphic objects, some Microsoft Slide masters are "nicked," and drawing objects don't always convert faithfully.

Likewise, the polish of Microsoft PowerPoint and Corel Presentations is lacking.

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Diskeeper 5.0 defrags NT systems

Continued from page 64

Installation and operation

The goal of Executive Software has been to make Diskeeper a "set and forget" utility. Installation is fairly straightforward, both on Windows NT Workstation and Server (you have to buy a separate version of Diskeeper for the Server). Diskeeper is quite robust in the versions of NT supported (both Alpha and Intel 86) and types of disks supported. It supports both SCSI and IDE in primary and extended partitions, logical drives, volumes sets and RAID arrays. More importantly, Diskeeper can defragment while other applications are running, with negligible effects on the applications performance. This ability to run in the background and transparently optimize disk usage is one of its key attractions.

Benefits of defragmenting

Defragmenting does not result in a uniform improvement in performance (see Table 1).

Table 1

Performance after defragmentation

Windows NT Workstation task	Improvement (time)
OS boot up time	15%
OS Logon in time	68%
Word 97 operations load, save, etc.	57%
Excel 97 operations load, save, etc.	83%
PowerPoint 97 operations load, save, etc.	34%

The better run times are spread fairly widely—as low as 15 percent to as high 83 percent faster. But the crucial factor is that not just startup and file operations are affected—overall response time also improved after defragging. However, improvements varied widely from each defrag session. Our initial defrag showed the most improvement and this may because the system had not been defragmented for quite some time. In general, one of two recommendations most frequently made to speed up your system cheaply is to add more memory beyond the minimum and to defrag your disk drives. We can testify that the latter certainly does help.

The out-of-the-box experience with Diskeeper was very good, with no installation problems or difficulties in understanding the manual or the easy-to-navigate graphical user interface. The several options for running and scheduling defrag operations were well described in the manual. The most important mode was being able to run defrag at the same time as you continued to work in Windows NT server. This did not appear to slow response time—but we did not check it against a heavily loaded system.

With Windows 2000, Microsoft will be supplying a defrag utility. As well Executive Software will release Windows Diskeeper 2000. It will be interesting to compare the two for speed, ease of operation and overall utility. Meanwhile for thousands of Windows NT users Diskeeper is a good defrag place to be. ❑

Jacques and Nathan Surveyer are PC consultants. They can be reached at nss_pcmac@kawerthe.com

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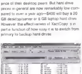
XactCopy mirrors OS for fast recoveries

Continued from page 64

keeping a hidden, up-to-date copy of those files all along.

The cost of such quick recovery is the cost of XactCopy (see prices above) plus a second hard disk. This solution may not immediately appeal to notebook PC users as dual hard disk-capable notebooks are uncommon and hard disks for portables are about triple the price of their desktop peers. But hard drive prices in general are now remarkably low compared to even a year ago—$400 will buy a 20 GB desktop/server or 6 GB laptop hard drive. However the effectiveness of XactCopy is in part a function of how easy it is to switch from primary to backup hard drives.



Simple if you know how

For administrators of server systems that are used to hot swapping and pulling and replacing hard drives, using XactCopy is no big deal. But as noted, for most notebooks and desktop systems, switching a drive from primary to secondary is not a trivial task. DuoCor acknowledges that the bulk of its customers were either server-based or had access to capable tech support people.

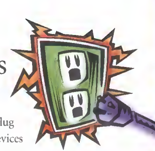
Two other potential hitches with XactCopy are that the system file backup and the hidden backup record are identified as a virus by some anti-virus software. In the latter case, Norton Anti Virus has already changed its signature files to correct this, and DuoCor is working with other anti-virus vendors to correct this "cry-wolf" problem.

In the case of system backups, users may not want system files to be a part of the regular automated backup facility and may choose to store them manually. Why? Many system crashes occur after new software is installed, which can create clashing DLLs or other subtle system registry snafus. It can take anywhere from one day to a full week for these problems to surface. So DuoCor recommends system backup always be done manually just before the next system/application software is installed, or a week after.

I asked the president of DuoCor, Bob Albert, whether the company has plans to expand into other markets such as Linux or Unix. He said that with the growth of the Web and more workgroup servers, the market for fast backups is really percolating, and that DuoCor has a Linux version of XactCopy on tap. Albert was more excited, however, about the techniques DuoCor had developed to back up system files on RAID drives for fast reboots. When I asked about the prospect of Windows 2000, with its much improved reliability and availability, putting his company out of business, he just chuckled. ❑

Jacques Surveyer is a consultant and writer. He can be reached at http://www.inforamp.net/~jbsurv

When the lights go out



TCP Lab pulls the plug on the latest UPS devices

By Sean Carruthers

One of the most traumatic events in any PC user's computing experience is that first time the power goes out in the middle of a work session. One second, a lot of important facts and figures are laid out in front of you on the screen and in the next, the screen is dark and hours of work are lost (we never seem to save our work as regularly as we should, after all).

> Many people are under the impression that a UPS is strictly a business device, but with prices of the units dropping, even home users can justify the cost of adding one to a system

Many businesses have long known about and used uninterruptible power supply (UPS) systems, and many home users are starting to catch on too. The standard UPS acts as a buffer between your computer equipment and standard electrical outlets: an internal battery charges while you work, and should the power fail, the UPS switches over to the battery so quickly that there is no interruption of power to computer equipment.

Even if the power doesn't go off completely, other power problems can make computers freeze up or cause hardware damage. Typically, power should be delivered at a regular voltage with a regular sine wave pattern. In densely populated urban areas, where power resources and equipment are often strained, what comes out of the outlet can be very "dirty," owing to fluctuations in the voltage or frequency of the power. Because of this, many UPS units also have power conditioning features that protect computer equipment from other power-associated problems like spikes, surges and sags (see UPS glossary).

Many people are under the impression that a UPS is strictly a device for businesses, but with prices of the units dropping, even home users can justify the cost of adding one to their PC system. With the advent of ADSL and cable modem connections, some users are leaving their PCs on for extended periods, thus increasing the risk of power disruptions and equipment damage. Although a few hundred dollars may seem like an excessive investment up front, it can certainly seem worthwhile after a power disruption occurs.

The appropriate amount of power

Once you've decided that you'd like battery backup for your PC, it's important to make sure that you choose a unit with the right volt-amps (VA) rating. This rating measures the amount of power a UPS can deliver following power failure: the higher the VA number, the longer the UPS will last. The actual runtime of each UPS will depend on how many items are drawing on the battery's reserve power and how much current they typically draw. The more items you have drawing from the battery, the shorter the runtime.

Previous generations of UPSes tended to be bulky, noisy and somewhat unattractive. In contrast, many of today's models are designed with the typical consumer desktop in mind. Although there are still UPS models available that resemble the unattractive bricks of old, some entry-level units take the shape of power bars, and feature just enough runtime to allow the user to conduct a graceful shutdown.

UPS glossary

- **Blackout:** Total loss of power.
- **Surge:** A short and small increase in voltage. Can be caused when nearby equipment switches off.
- **Spike:** A very fast period of extreme overvoltage, typically between .5 and 100 microseconds. Often caused by lightning strikes.
- **Swell:** A longer version of a surge.
- **Sag.** Usually a short and small decrease in voltage, but sometimes last longer. Can be caused when other equipment starts up.
- **Dip:** A very short undervoltage condition. The inverse of a spike.
- **Brownout:** Another name for a sag.
- **Harmonic distortion:** Irregular frequency shifts in the power waveform. Can be caused by other equipment on the same power line.

> VA stands for volt-amps, and measures the amount of power the UPS can deliver following power failure; the higher the VA number, the longer the UPS will last

For a little bit more money, users can get units with longer runtime and more power conditioning features. Many of these units feature jacks on the rear for protection of phone or Ethernet lines. Also, higher-end units are more likely to support cold starts—the ability to power up a UPS after the power failure has occurred (many still require AC power to jump start the UPS).

Shutting down in style

Although it's nice to have a few minutes of battery backup available to shut down programs, it must be acknowledged that not everyone will be in front of the PC when the power goes out. Previously available only on high-end UPS models, power management software is now becoming widely available, even on lower-priced consumer models.

With this software, users can monitor the status of the power they are receiving, and automatically save open documents and shut down when the power fails. With some UPS packages, the software can also be set up to monitor and administer other UPSes on a network, and even individual outlets on one UPS. Some software can be configured to send status reports to administrators or beep an administrator's pager.

Most UPS units communicate with a PC via the serial port, although some of the new models use the USB interface instead.

Pulling the plug

To test our UPS models this month, we simulated a total power failure by pulling the ➤

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plug out of the wall, then measured two events: the time to low-battery warning and the time to battery failure. All of the UPS units were fully charged when the power was cut, and all were tested with the same test PC—a 233 MHz Pentium II-based system with a 15 inch monitor. It should be noted that the runtime we recorded is specific to our test system, and will vary based on the power load placed on it by your own components. A larger monitor will draw more power and shorten the runtime. If a CD-ROM drive is running when the power fails, the runtime will also be reduced. A printer and Zip drive will also place demands on the battery. The figures we've quoted here are included merely to give readers a general idea of the runtimes of one UPS relative to another. Your runtime can and will vary based on your system configuration and power requirements.

Note: As many of the UPS models we received this month were sent to us directly from their U.S. manufacturers, the pricing we obtained was in U.S. funds and has been converted (in those instances, original price is shown in parentheses). Because of that, pricing may vary as the exchange rate with the Canadian dollar fluctuates, and may vary from region to region.

APC Back-UPS Office 400
Suggested retail price: $179 (converted from US$119)

Runtime: 16 min. 23 sec.
Low battery warning: 13 min. 1 second

- Power rating: 400 VA.
- Set up like a power bar, but larger
- Six outlets in total: three backed up by the battery and three for surge only. One outlet of each type is offset from the others for plugging in transformers.
- Jacks on the back protect two telephone line or one 10Base-T line
- Does not support cold start
- APC offers up to US$25,000 compensation for UPS-related equipment damage

For users who need a power bar, this may be the perfect option. Although it doesn't have as many features as some of the larger UPS models, its runtime is reasonable, and the offset outlets allow for larger power transformers (AC adapters) to be plugged in. The communications protection is a nice bonus.

APC Back-UPS Pro USB 500
Suggested retail price: $445 (converted from US$299)
Runtime: 19 min. 10 sec.
Low-battery warning: 16 min. 30 sec.

- Power rating: 500 VA
- Instead of the more common serial connection, it uses USB to link with computer
- Ships with Power Chute Plus software for safe shut down and saving of open files; works with Windows, Novell NetWare, UNIX (several variations), Linux, Mac OS and OS/2
- Angular design allows the unit to be oriented with outlets at either front or rear while still allowing users to see the status lights.
- Seven outlets in total: four backed up by battery, three for power conditioning only. One outlet of each type is offset for use with larger power adapters
- Jacks on back protect one telephone line or one 10Base-T line
- Supports cold start
- APC offers up to US$25,000 compensation for UPS-related equipment damage

The Back-UPS Pro USB 500 is a more powerful solution than the Office 400. It has more outlets than any of the others reviewed this month, has a reasonably long runtime, flexible design and communications protection. For users who have already maxed out their serial ports, the USB connection is a nice option.

APC Back-UPS Pro 650
Suggested retail price: $560 (converted from US$375)
Runtime: 48 min., 30 sec.
Low battery warning: 43 min., 15 sec.

- Power rating: 650 VA
- Six outlets in total: three are battery protected, and for three power conditioning only. One battery backed-up outlet and one power-conditioning outlet are in the form of cables leading from the back of the UPS, allowing users to attach large transformers without interfering with the other outlets
- Ships with Power Chute Plus software for safe shut down and saving of open files. Works with Windows, Novell NetWare, UNIX (several variations), Linux, Mac OS and OS/2
- Jacks on back protect one telephone line or one 10Base-T line
- Supports cold start.
- APC offers up to US$25,000 compensation for UPS related equipment damage

Designed for power users, the Back UPS Pro 650 has a lengthy runtime, communications protection and a good number of outlets. The flexibility of the two extended outlets is a really nice feature, allowing users to attach larger transformers without having to increase the man of the UPS itself.

Amedell IPPS-1200B-UAX
Suggested retail price: $159

Runtime: 4 min. 12 sec.
Low-battery warning: 3 minutes

- Power rating: 120 VA.
- Replaces an ATX power supply inside a PC
- Features one power out socket for connecting a monitor.
- An internal cable can be snaked out the back of the PC for communication with the PC via the serial port
- IPPS Commander software monitors the system, saves open files, and conducts safe system shut down under Windows
- Supports cold start

➤

	APC Back-UPS Office 400	**APC Back-UPS Pro USB 500**	**APC Back-UPS Pro 650**	**Amedell IPPS-1200B-UAX**	**Belkin Regulator Pro 325**	**Belkin Regulator Pro 525**	**MGE Pulsar ES 5+**
Power rating: volt-amps	400	500	650	120	325	525	480
Power rating: watts	250	315	410	200	211	342	280
Outlets: battery backup	3	4	3	monitor power out	2	2	2
Outlets: power conditioning only	3	3	3	NA	1	1	0
Connection to PC	none	USB	serial	serial	none	serial	serial
Telephone / network jack protection	either	either	either	none	none	either	telephone
Shutdown software included	no	yes	yes	yes	no	yes	yes
(supports non-Windows OS)	NA	see article	see article	no	NA	Novell	see article
Supports cold start	no	yes	yes	yes	yes	yes	yes
Equipment warranty limit	US$25 000	US$25 000	US$25 000	US$15 000	US$40,000	US$80 000	US$35 000
Runtime (computer and monitor*)							
Time to low battery warning	13:01 min	16:30 min	43:15 min	3:00 min	5:30 min	19:34 min.	16:00 min
Time to total battery discharge	15:23 min	19:10 min	48:30 min	4:12 min	8:20 min	22:40 min	19:30 min
Dimensions (WxDxH) (cm)	43.2x17.7x6.9	12.7x20x23.5	18.8x11.8x36.8	15x14x8.5	9.7x26x13.5	9.7x32x13.5	4.5x29x28.5
Weight (kg)	3.9	7	13.2	2.5	5	6.5	4
Contact number	800-800-4272	800-800-4272	800-800-4272	877-267-3355	800-223-5546	800-223-5546	800-354-6119
Web site	www.apcc.com	www.apcc.com	www.apcc.com	www.amedell.com	www.belkin.com	www.belkin.com	www.mgeups.com
Warranty period	2 years	2 years	2 years	1 year	2 years	2 years	2 years
Suggested retail price	$179**	$445**	$560**	$189	$179**	$255**	$250**

	Opti-UPS Power VS 500	**Opti-UPS Power PS 500**	**Powerware 3115 420VA**	**Powerware Prestige 650VA**	**Tripp Lite Internet Office 500**	**Tripp Lite SmartPro 450 RT**	**Tripp Lite OmniSmart 675 PNP**
Power rating: volt-amps	500	500	420	650	500	450	675
Power rating: watts	500	310	252	455	280	270	425
Outlets: battery backup	2	4	2	4	3	4	3
Outlets: power conditioning only	1	NA	NA	NA	3	1	3
Connection to PC	serial	serial	serial	serial	serial	serial	serial
Telephone / network jack protection	either	either	none	none	telephone	none	telephone
Shutdown software included	optional	yes	yes	yes	yes	yes	yes
(supports non-Windows OS)	OS/2, Novell	OS/2, Novell	see article	see article	see article	see article	see article
Supports cold start	no	yes	yes	no	yes	yes	yes
Equipment warranty limit	US$25 000	US$25 000	US$50 000	US$50 000	US$25 000	US$50 000	US$50 000
Runtime (computer and monitor*)							
Time to low battery warning	21:55 min.	20:45 min	13:07 min	58:50 min	18:15 min	24:16 min	43:35 min
Time to total battery discharge	23:15 min	22:48 min	20:35 min	61:22 min	20:37 min	25:23 min	46:40 min
Dimensions (WxDxH) (cm)	12.7x28x35.5	13.8 x20x42.7	8.6x15.5x37.1	25.1x14.2x40.1	13x17x21.5	43.5x28x4.5	13x24x17
Weight (kg)	4.5	11.4	5.2	12.9	6.3	7	10.4
Contact number	888-678-4877	888-678-4877	800-461-9166	800-461-9166	773-869-1111	773-869-1111	773-869-1111
Web site	www.opti-ups.com	www.opti-ups.com	www.powerware.ca	www.powerware.ca	www.tripplite.com	www.tripplite.com	www.tripplite.com
Warranty period	3 years	3 years	5 years	10 years	2 years	2 years	2 years
Suggested retail price	$149**	$339**	$270	$899	$234	$430	$518

*Runtime on our test system. Individual results will vary depending on total power load.
**Converted from pricing provided by U.S. manufacturers. Pricing may fluctuate with the value of the Canadian dollar.
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- After complete loss of battery power unit may not fire up immediately even after AC power is restored; may require recharging first.
- Amsdell offers up to $15,000 compensation for UPS-related equipment damage.

IPPS stands for Integrated Power Protection System, which pretty much describes the Amsdell unit. It replaces a typical ATX power supply providing the same function as a power supply, but offering a few minutes of runtime in case of power failure. It's not as flexible as a standard external UPS (it only has one outlet for powering the monitor) but it doesn't take up any extra space on the desktop. For those looking for just enough time to gracefully shut down their systems, this unit is an attractive "stealth" option.

Belkin Regulator Pro 325 VA
Suggested retail price: $179 (converted from US$120)
Runtime: 9 min., 29 sec.
Low-battery warning: 5 min., 30 sec.

- Power rating: 325 VA.
- Three outlets in total: two powered on the back and one surge-only outlet. Outlets are placed fairly tightly together and won't accept larger AC adapter transformers.
- No connection to PC or shutdown software included.
- Supports cold start.
- Belkin offers up to US$40,000 compensation for UPS-related equipment damage

Although more famous for USB products and computer cables, Belkin also makes a line of UPS units. The Regulator Pro 325 VA model is at the entry level and is, consequently, fairly basic. The runtime is long enough for a user to quickly finish work in progress, save and shut down their system. The outlet layout on the back is a bit cramped, which means it isn't compatible with AC adapters, but those who only need to plug in a standard PC and monitor may find it to be an ideal solution.

Belkin Regulator Pro 525 VA
Suggested retail price: $255 (converted from US$170)
Runtime: 22 min., 40 sec.
Low-battery warning: 19 min., 34 sec.

- Power rating: 525 VA.
- Three outlets in total: two powered on the back, and one surge-only outlet. Outlets are placed fairly tightly together and won't accept larger transformers.
- Protection is provided for either one telephone or one 10Base-T jack.
- Uses a serial connection to PC to monitor UPS status.
- Shutdown software is included. Automatically saves files under Windows and Novell NetWare
- Supports cold start.
- Belkin offers up to US$80,000 compensation for UPS-related equipment damage.

Armed with a longer runtime than the 325 VA model, Belkin's 525 VA also comes with a few other features, including communications protection, communication with the PC and shutdown software. Its runtime is reasonably long, and the pricing is quite attractive. Like the 325 VA, this unit is plagued by a tight and unusual outlet configuration. But again, it may be a suitable solution for those who only need to power a PC and monitor.

Note: Belkin also offers UPS models with identical configuration as the 525 VA, but in 425 VA (US$150) and 625 VA (US$200) versions.

MGE Pulsar ES 5+
Suggested retail price: $250 (converted from US$169)
Runtime: 15 min., 30 sec.
Low-battery warning: 16 min.

- Power rating: 480 VA.
- Designed to be rack mounted, but can also stand upright using a plastic brace.
- Two outlets in total, both of which are located on the back and backed up by the battery.
- Uses serial connection for communication with PC.
- Solution Pac software monitors UPS, offers networking options, saves files and conducts safe system shutdown under Windows, Mac OS, OS/2, Novell NetWare, UNIX (several varieties) and Linux.
- Jacks on the back protect one phone line.
- Supports cold start.
- MGE offers up to US$35,000 compensation for UPS-related equipment damage.

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At home either in a rack or sitting on the desk top, MGE's Pulsar ES 5+ delivers a reasonable runtime, protects a phone line, and offers powerful networkable software for UPS management. With only two outlets, it may be too minimal for some users. However those who only need to protect a PC and monitor may want to consider this model—especially with its unconventional and eye catching design.

Note: MGE has a new series of UPS models, known as Pulsar Ellipse, but we were unable to get evaluation units by press time. We hope to take a look at them in the coming months.

Opti-UPS Power VS 500

Suggested retail price: $149
(converted from US$99)
Runtime: 23 min., 15 sec.
Low battery warning: 21 [illegible]
55 sec.

- Power rating: 500 VA
- Three outlets in total: two backed up by battery and one for surge only
- Orientation and positioning of outlets may make it difficult to use transformers
- Jacks on the rear protect either one phone line or one 10Base-T line
- Uses serial connection for communication with PC
- Does not include shutdown software, but such software can be purchased from Opti-UPS for US$20
- Does not support cold start
- Opti-UPS offers up to US$25,000 compensation for UPS-related equipment damage

The VS line is Opti-UPS's Value Series, and the company certainly delivers on this promise. Even at its low price, this unit provides excellent runtime and communications protection. It can also communicate with the PC, though shutdown software must be purchased separately. The outlet layout may be problematic for some users, but those with basic needs will find that this model delivers a lot for only a small amount of money.

Opti-UPS Power PS 500

Suggested retail price: $339
(converted from US$229)
Runtime: 22 min., 48 sec.
Low battery warning: 20 min., 45 sec.

- Power rating: 500 VA
- Four outlets in total, all of which are backed up by the battery.
- LED indicators on the front indicate remaining charge and outlet status at a glance
- Uses serial connection for communication with PC. Opti-UPS also sells a serial to USB converter for US$35
- OptiSafe+ software monitors the UPS, and allows saving of files and shutdown of the PC under Windows, OS/2, and Novell NetWare
- Users can group outlets and control shutdowns separately (keep PC and monitor on, but shut off printer and scanner, for example)
- Jacks on the rear protect one phone line or one 10Base-T line
- Supports cold start
- Opti-UPS offers up to US$25,000 for UPS-related equipment damage

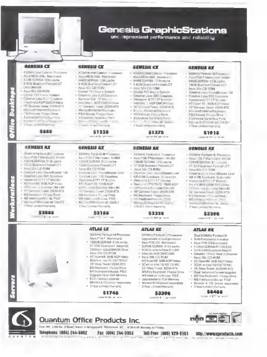
The PS line is Opti-UPS's Professional Series. As you'd expect, units in this line come with a number of advanced features. The Power PS 500, for example, includes individual outlet control, advanced power management software and com[illegible] [illegible]. The ability to quickly [illegible] remaining is also [illegible] future. It is also fairly reasonable [illegible] this [illegible] worth a look if you [illegible] more demanding power requirements.

Powerware 3115 - 420

Suggested retail price: $270
Runtime: 20 min., 35 sec.
Low battery warning: 13 min., 7 sec.

- [illegible]
- [illegible]
- [illegible]
- [illegible] software for [illegible] It also covers Mac [illegible] and Novell NetWare
- [illegible] angled for use with the top socket of [illegible] outlets
- Five year warranty is longer than most
- Powerware offers up to US$50,000 compensation in case of UPS-related equipment damage

Formerly Exide Electronics, Powerware offers a lot of high-end UPS solutions, but manufactures a value line as well. The 3115 series comes in models from 300 through 650 VA, and we had a chance to look at the 420 VA model. The configuration is pretty basic, with only two outlets, but it includes good power management ➤



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MS NT 4.0 Work Station	$169
MS Home Bundle/ Essential	$58/119
Norton 2000/ McAfee Virus Scan	$69/49
Sanctity 3000/ Money 00	$49/49
Thief	$39
Windows 98 with system only	$135
MS Office 97 upgrade	$139
MS Work Suite 99	$99
MS Word 97/ Excel Upgrade	$59/69
MS Front Page 00 Upgrade	$139
MS Plus 00	$29
MS Office 2000 Pro (OEM)	$429
MS Office 2000 (OEM) / Small BV	$265
Picture It 00/ Publish Deluxe	$59/139
Accpac Simply Accounting V 7B	$149

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140W / Subwoofer Speaker	$15/30
Zenon 6000 500W	$58
Cambridge PC Works	$89
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Rock Live 4 Speakers & Subwoofer	$55

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ATI Xpert 98 / 99 8MB	$75/92
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Brother 1020/1040DX/1050DX	$399/429/540
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Canon BJC 5000 / 6000 ($50 rebate)	$295/360
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Soundblaster PCI 128 / 512 Bit	$49/69
Soundblaster Live Value/Live Retail	$79/268
Soundblaster Live Platinum	$268

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software, long runtime and an excellent warranty. If your major concerns are powering a monitor and PC, Powerware's 3115 is certainly worth consideration.

Powerware 9 Prestige 650
Suggested retail price: $898
Runtime: 61 min., 22 sec
Low-battery warning: 58 min., 50 sec

- Power rating: 650 VA
- Four outlets, all backed up by the battery
- LED indicators show remaining power level at a glance
- Online design for better power protection
- Uses serial connection for communication with PC
- FailSafe III power management software for Windows and OS/2. FailSafe III also covers Mac OS, UNIX and Novell NetWare, and manages multiple UPS units over a network
- Ten year warranty is extra long
- Powerware offers up to $50,000 in case of UPS related equipment damage

On the more professional end of the spectrum, we have the Powerware 9 Prestige 650 model. The "9" indicates that this unit can can correct nine different power problems. In addition to providing battery backup in case of failure, units in the Powerware 9 series can protect against surges, sags, brownouts, line noise, spikes, frequency variation, switching transient, and harmonic distortion. Although this level of protection boosts the cost of the unit, users who work in areas with exceptionally dirty power may find it absolutely necessary. The extra cost is somewhat easier to justify when considering the runtime of this unit at more than an hour; it was the longest of the units we tested.

Tripp Lite Internet Office 500
Suggested retail price: $234
Runtime: 20 min., 37 sec
Low-battery warning: 18 min., 15 sec

- Power rating: 500 VA
- Six outlets in total: three backed up by battery and three for power conditioning only. Outlets are arranged upside down and placed rather tightly together so users may find that plugging in large transformers or transformers with polarity protector blocks other outlets or the serial connector
- Uses serial connection for communication with PC
- PowerAlert software shuts down computer and saves programs in event of power failure. It can also manage safe shutdowns for other PCs on a network. Software works with Windows, UNIX (several types), OS/2, and Novell Netware
- Jacks on the rear provide protection for one telephone line
- Tripp Lite offers up to US$25,000 compensation for UPS-related equipment damage

Tripp Lite's Internet Office 500 is a compact little unit that sports a lot of outlets, good runtime, communications protection and powerful shutdown software—and all for a reasonable price. Because of the compact design, however, the outlets are packed fairly closely, which could be problematic for larger transformers (AC adapters). Users with stro dard plugs however will like the space saving design. Everyone will appreciate the long run time and low price.

Tripp Lite SmartPro 450 RT
Suggested retail price $439
Runtime 25 min 23 sec
Low-battery warning 24 min 18 sec

- Power rating 450 VA.
- Unit is rack-mounted but can also be placed under a monitor or tucked away upright beside a tower case
- Five outlets in total: four backed up by battery and one for surge protection only
- This design means users may not be able to use transformers with the UPS when used under the monitor. One outlet can comfortably handle a transformer when unit is standing upright however
- Uses serial connection for communication with PC
- PowerAlert software shuts down computer and saves programs in event of power failure and is able to manage safe shutdowns for other PCs on a network. Software works with Windows, UNIX (several types), OS/2 and Novell Netware
- Accessory slot for SNMP cards, network management and connectivity products.
- Tripp Lite offers up to US$50 000 compensation UPS-related equipment damage.

Although the SmartPro 450 RT is designed to be mounted on a server rack, it illustrates why such models may be worth consideration for a desktop PC user. Its slim design allows it to be tucked under a monitor or hidden away in any other tight space. It also has a long runtime and batteries can be changed easily. Of course, it's most at home in a server room, where it excels.

Tripp Lite OmniSmart 675 PNP
Suggested retail price $519
Runtime 46 min 40 sec
Low battery warning
43 min 35 sec

- Power rating 675 VA
- Styled like the Internet Office series but taller and with longer runtime
- Six outlets in total: three backed up by battery and three power conditioning only. Outlets are arranged upside down and packed fairly tightly together which could be problematic for those with polarity protected or overly large transformers. Also plugging a transformer into the top left outlet may cover the serial connector
- Uses serial connection for communication with PC
- PowerAlert software shuts down computer and saves programs in event of power failure and can manage safe shutdowns for other PCs on a network. Software works with Windows, UNIX (several types), OS/2 and Novell Netware
- Jacks on the rear provide protection for one telephone line
- Tripp Lite offers up to US$50 000 compensation for UPS-related equipment damage.

Slightly taller than the Internet Office 500, the OmniSmart 675 PNP model offers the same features but a much longer runtime. Again, the outlet configuration may not be ideal for those with larger transformers, but those with standard plugs will find the OmniSmart 675 PNP a powerful little unit.

The ComputerPAPER
Editor's
CHOICE

Editor's choice

Tripp Lite Internet Office 500
This unit has a good runtime, a lot of outlets and is affordable. For users looking for a powerful, value priced solution, this one is a good choice.

APC Back-UPS Office 400
Many users will require a power bar, and this is a great way to add power protection at the same time. For a 400 VA model, the price is attractive too. ❑

Bearing all in Minnesota

NB—In addition to affirming that winter cold comes early in Minnesota, an unusual Web cam is offering what's being billed as the Internet's first live view of a wild bear's den. Three-year-old black bear Whiteheart has already dozed off for her winter hibernation, so visitors to the Web site of Discovery Online can take their time following the work of biologist Dr Lynn Rogers and his team from the North American Bear Center. They'll be monitoring the same video feed from a nearby cabin in the Minnesota woods. Discovery Online says scientists don't know for sure what happens during a bear's long winter nap and are hoping the special weather-proof infrared camera inserted through a plastic tube into Whiteheart's cave will help them find out. The team says it may have lucked out when it chose to spy on Whiteheart, since the bear appears to be pregnant. If so, the birth would occur during her slumber period, probably in January.

http://www.discovery.com/cams/bear/bear.html

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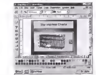
StarOffice

Continued from page 6



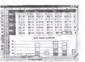
StarOffice Impress interface

Chart lines and borders are jaggy or don't always maintain thickness, auto scaling of text in slides is unavailable right mouse control of slide shows is lacking plus half a dozen other small inconsistencies But StarOffice Impress/Chart offers more immediate drawing and charting options It is about 90 percent equivalent to its counterparts and earns a seven out of 10 rating

StarOffice Calc

In our previous review of office suites I was amazed to discover that Corel's Quattro Pro had out excelled Microsoft Excel in the range and versatility of its spreadsheet's formulas and functions. StarOffice Calc does not exceed Excel, but it certainly matches the Microsoft product's range of formulas and calculation capabilities In laying out a classic spreadsheet including plotting monthly sales for 16 products, StarOffice Calc proved just as adept as its counterparts—doing the layout in a very fast five minutes with a helpful wizard to set up the chart

However, StarOffice Calc does not have the refinement of Microsoft Excel and Corel Quattro Pro in doing hierarchic database displays, formula auditing and pivot table operations. Just as in the case of goal seeking and matrix manipulations StarOffice Calc has the basic core features but not the same ease of use, wizards or functional extras available in Excel and Quattro Pro However StarOffice Calc does have advanced charting controls and special math capabilities that can be more quickly broken down into components with either recordable macros or StarOffice Basic scripts StarOffice Calc is about 80 percent equivalent to Excel and earns a seven out of 10 rating



StarOffice Calc interface

StarOffice Base

StarOffice Base is similar to Lotus Approach in that it is not a complete implementation of a database on a PC Lotus has taken the approach of using the Access Paradox, and dBase standards (or more properly the ODBC standard) rather than creating another PC database type, so any database that is ODBC-compliant is Lotus Approach able StarOffice Base follows Approach's footsteps, so any database that can talk through either ODBC or JDBC interfaces can be read and edited with StarOffice Base However StarOffice Base has its own PC database format as well, with Access like functionality for designing and creating/maintaining a database.

Continued on page 80

Table 1

Office suite tools compared

	Sun Microsystems StarOffice	E	R	Corel WordPerfect Office	E	R	Microsoft Office	E	R
Word process.	StarOffice Writer	90	6	Word Perfect	100	8	Word	100	8
Web dev.	StarOffice Write/Web	65	6	Trellix/NetPerfect	70	7	Front Page	100	8
DTP	StarOffice Draw/Image	80	7	Print Office/House	70	7	Publisher/PhotoDraw	100	8
Presentations	StarOffice Impress/Chart	90	7	Presentations	100	7	PowerPoint	100	8
Spreadsheet	StarOffice Calc	85	7	Quattro Pro	100	8	Excel	100	8
Small business	NA	NA	NA	Small Business	60	7	Small Business Tools	100	7
Database	Star Base	80	5	Paradox	35	7	Access	100	7
Utilities	Star Schedule/Mail	70	6.5	Corel Central	80	7	Outlook	100	8
Scripting	Star Basic/Macro	85	7.5	VBA or Corel Script	90	8	VBA	100	8
Extras	Explorer/Stylist/Beamer	NA	NA	Naturally Speaking	NA	NA	NA	NA	NA

E = equivalency rating (percentage). NA = Not applicable. R = Overall rating (out of 10).

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- Win98 keyboard
- Logitech 2 buttons PS/2 Wheel mouse
- Acer 56k V.90 Internal Fax Modem
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P-III 500/550 $1696/$2059
P-III 600/650 $2254/$2499
P-III 700/733 $2765/$2650

Pentium-II Gamer
- Acer AX63 ATX Mainboard
- VIA Slot-1 PC133
- 64Mb SDRam PC-133
- 8.4Gb Ultra DMA 66 Hard Drive
- 3.5" 1.44Mb Floppy Drive
- TNT2 32MB AGP Video Card
- 44X EIDE CD-ROM
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- Win98 keyboard
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- 19" ATX Tower Case CSA PS
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Cele 400/433 $1130/$1140
Cele 466/500 $1168/$1235
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AMD Super Socket-7
- AcerMX59Pro ATX Mainboard
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K6-2 350/400 $889/$899
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- Logitech PS2 Mouse W/Pad
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StarOffice

Continued from page 78

So how is StarOffice Base like or unlike Approach and where have corners been cut? Unlike Approach, StarOffice Base has only skeleton Forms and Report creation capabilities. StarOffice Base has wizards and templates that help you get almost pre canned queries, reports and forms, but there are weak visual forms and no reports-designer equivalent to those in Access, Approach and Paradox that allow users to easily modify or extend the newly defined forms and reports In addition, the link to StarOffice Basic is not as robust as its competitors links to application development features, which supply debuggers, viewers and other tools If you have surmised that StarOffice Base is the weakest link in StarOffice you are correct It is barely 60 percent equivalent to its rivals, and garners only a five out of 10 rating overall

StarOffice Draw/Image

Imagine you are part of the Microsoft Paint development team. For the past 10 years, you have done nothing but make Paint work in the various incarnations of the Windows operating system StarOffice Image is where the Paint crew would be if they half tried The StarOffice Draw/Image combination is the direction graphics in general is going—combining bitmap 2D vector, and 3D technologies, allowing designers to create with relative ease.

StarOffice Draw/Image does not have the 2D polish of Microsoft Office 2000's PhotoDraw or the wealth of clip art goodies bundled with Corel's Print Office, but it does allow 3D creation tools, including text effects that are becoming ever more useful in presentations, illustrations and Web site development. However, StarOffice Draw/Image does lack the desktop publishing capabilities of Microsoft Office 2000's Publisher Thus, the StarOffice Draw/Image earns a 60 percent equivalence rating, and a seven out of 10 overall rating.

Utilities, scripting, extras

StarOffice Mail, StarOffice Schedule and StarOffice Discussion have the virtue of being tied in with StarOffice so that editing an email message brings the full power of StarOffice Word and StarOffice Calc to help you bare your soul or make your point However, it can become confusing to navigate among the different StarOffice Modules StarOffice needs what Corel Suite already has Perfect Expert the best task oriented coach in all of the office suites Having said that, StarOffice has its own extras in the form of Explorer, Beamer and Navigator—which form a poor man's Perfect Expert.

These StarOffice extras do indeed simplify access to files and Web resources (Explorer) help find clipboard-like chunks of text image and objects (Beamer), and speed up moving between components in complex compound documents (Navigator) StarOffice's HelpAgent will aid new users in getting used to the power and convenience of Explorer, Beamer and Navigator But don't make the mistake I did in expecting Navigator to work in StarOffice Calc or StarOffice Impress the way it does in StarOffice Word. Fortunately Beamer and Explorer work in most StarOffice Modules.

On the scripting side, StarOffice, like Lotus, insists its StarOffice Basic is equivalent in functionality to Visual Basic for Applications (VBA)—the complete development environ of which is available in Microsoft Office 2000 and Corel WordPerfect Office 2000

The reality is that VBA is moving so fast especially in the database, objects and Web arena that even Microsofties are hard pressed to keep up VBA is leagues ahead of StarOffice Basic and LotusScript (which is not as far behind) in both functionality and the completeness of the development environ. Users can and do develop complete commercial software based on WordPerfect, Excel, Quattro Pro, or Access using VBA.

Although StarOffice Basic does not have the developer muscle of VBA, its macro recording capabilities and simple scripting may be just perfect for automating the routine and simple repetitive tasks that crop up in the PC workplace We found StarOffice Basic a bit cryptic at first, then just right for simple macros and scripts. So again, StarOffice Basic garners a low equivalency score to VBA—at 65 percent—but a high program rating of 7.5 out of 10 for its overall utility

What's in a Star?

In comparison to the top two office suites (see table) the shine from StarOffice twinkles, but not evenly The core of StarOffice—StarOffice Word StarOffice Calc, and StarOffice Impress/Chart for presentations—matches the top suites closely But beyond that, StarOffice becomes more of a pulsar beaming occasion

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Unrestricted Web access for mobile devices possible

STANTON Calif—Digital Paths has announced a software technology that [illegible] intelligently wraps lines and graphic [illegible] viewing on a small screen Web browser such as that seen on mobile devices

The firm says the technology—known as DPWeb—has already been developed for the Palm platform and that editions for other platform are being developed

The DPWeb software for Palm devices is now available for download from the firm's Web site (http://www.digitalpaths.net) and will run in its early edition on the Palm VII handheld computing device

Once DPWeb is transferred from the PC to the Palm VII the firm says, users need only point to the DPWeb icon to connect with the Digital Paths site which is the location of the Web service engine.

Users of other mobile devices can also point their browsers to the site but the end result is the same—direction to the appropriate start page for accessing the Web

The firm says users who access the Digital Paths site can then enter any URL (uniform resource locator) and view text content of frames wrapped to suit the line length of their mobile devices

Kia Shirali the firm's president says the Digital Paths server automatically recognizes the device type and transforms page data accordingly while filtering out high-bandwidth consuming graphics that would otherwise be unreadable on the tiny displays

"We're enhancing the value of the Palm Pilot and smart phones by giving those devices a go anywhere read anything capability" he said

Shirali added that the company is also indirectly saving a lot of money for millions of Web site operators that, for various reasons may not wish to invest in separate services for handheld devices at this time

Digital Paths says it is offering its software/Web portal-based service to end users free of charge and does not require user registration or identification for the basic service

By going through the Digital Paths portal the firm says that users can browse the Web anonymously—a privacy protection feature than can have a high value in itself to many consumers

Plans call for revenue to be generated by offering value-added services through the portal in the future These will include facilities such as bookmarking security firewalls special features for power users and customization for corporate intranets.

—*Newsbytes*

StarOffice

Continued from page 80

ally with modules like StarOffice Draw/Image but disappearing (no small business applications, for example) or nearly pulsing out with its database and desktop publishing offerings.

So why did Sun Microsystems pay several millions of dollars for StarOffice? Its core functionality is strong, and it has been consistently improving It runs uniformly on all the Windows environs, as well as OS/2 Linux and Solaris It reads and writes Microsoft Office files, including the latest Office 2000 formats (not with all of Office 2000's new features, but with some of its problems—StarOffice Impress, for example) Developers have been working on a Java version of StarOffice that Sun wants to make available over the Web for free so users will be able to download the latest StarOffice Modules to work the office suite anywhere in the world on any Windows, OS/2, Linux or Solaris PC or workstation for free

Free is the key word here I am constantly embarrassed when colleagues ask to "borrow" my Office 2000 CD-ROM saying that they can't find their own Heretofore, I have had to beg off, now I can propose a very viable alternative they can just load StarOffice from the CD ROM I keep handy It will read and write their Microsoft Office files and provide great home-side word processing drawing and spreadsheet capabilities

Likewise for students and users on a tight budget, StarOffice is very attractive. Finally savvy Web users may want to take a look at what is certain to become the office suite of the Web ❑

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Data anywhere model redefines remote access

A new set of remote access infrastructure standards will make it easier for cellular phones, Palm and portable devices to connect to each other and to the Internet without having to plug into the nearest phone jack

By Tom Venetis

Remote access, especially remote access to the Internet is poised for boom times Stamford Conn -based Gartner Group estimates some 130 million people will use some form of portable device to remotely connect to the Internet by 2003 And Newton, Mass based Business Research Group predicts nearly all large and mid sized corporations will incorporate remote access technology into their organizations in order to make information available to mobile employees.

"The single biggest trend is the [network] investment has shifted from the core of the network out to the edge of the network," says Bob Egan, vice president and research director for the Gartner Group "High speed networks are now being delivered into the home the hotel room and into various places where people will be connecting to the Internet through portable devices"

Egan says that along with this shift in network priorities, there is also a dramatic shift in what people are using to connect to the Internet and remote networks Previously it meant a computer or laptop device hooked onto a network or connecting through the telephone system to the Internet While this method will certainly continue to be used, in the future there will be a host of mobile devices that will provide access to the Internet and to networks without a direct, physical connection. These devices will include Internet ready cellular phones, wireless personal digital assistants (PDAs) Palm devices mini notebooks and even wireless organizers.

Once these become common the way people think of the Internet and networks will change as well Both will become service delivery devices "carrying everything from multimedia and MP3 music to software updates, news and productivity services," according to Egan

Continued on page 84

Knowledge and technology

Who's in charge here?

By Michelle Cook and Curtis Cook

Knowledge management remains a hot topic in the business world, which is surprising, considering how few people can actually clearly define what it means. Put simply, managing knowledge successfully means harnessing the diverse sources of data within a business and sharing it to enhance the effectiveness of the organizations operations. Effectiveness can refer to every part of the operation strategic decision-making ability competitiveness or profitability

Technology, particularly the introduction of diverse knowledge management software, has only clouded the picture over the last few years Defining the role of technology in knowledge management, rather than defining technology as knowledge management, is a first step in clarifying this management discipline.

Changing the culture

Data information and knowledge sources are everywhere Managing them with technology sounds easy until you actually think about what this entails More often than not a severe shift in corporate culture is required before technology can even be considered.

> "Data becomes information when it becomes relevant to what you are doing. Information becomes knowledge when it is used in the successful completion of tasks"
>
> *—Eric Alderson, Chronicle Technologies*

Some studies suggest that close to half of an organization's knowledge resides in its employees' heads, not on their hard drives Unfortunately, it's often the case that the existing business culture does not support knowledge sharing even between employees working towards the same goal Knowledge hoarding gives many employees a sense of importance while knowledge sharing is often a threatening proposition A knowledge management initiative is bound to fail if individuals are not willing to share what they know

Overcoming this barrier can lead to another obstacle: even if individuals are willing to share their knowledge with the organization, are they able to? This requires that an organizational system that supports knowledge management be in place, which is where technology can play a part In

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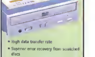

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Wysdom apps serve content to small devices

Wysdom Inc.'s (http://www.wysdom.com) Intelligence Suite and Wysdom Server gives businesses a means of delivering content to a wide range of mobile devices.

"There are two markets we are looking at," says Yousuf Chowdhary, vice-president of new products for the Richmond Hill, Ont.-based developer. "These include dot-com companies that have a wireless strategy to extend information and content on their Web sites out to subscribers or potential subscribers. The other is the enterprise market with people on the move who want to get in touch with their office in order to get email or information about the inventory."

Information is delivered through the Intelligence Suite and the Wysdom Server using WAP (Wireless Application Protocol) which allows the information to be put into a form that can be read by such devices as digital phones with display screens or Palm handheld devices. Because of the limitations on how these devices can display information, and the bandwidth issues, WAP allows a company to deliver content quickly and in a form that can be used by anyone. Information can include such things as notification, transaction confirmations, story summaries, promotions or timely data needed for a sale.

Chowdhary believes WAP will become a standard for wireless communications and has already garnered industry support. (More information can be found at the WAP Forum Web site at http://www.wapforum.org.)

"We all like to dream about the wonderful scenario of there being one uniform standard but as we have seen over the past years that is not the case," he adds. "There are multiple players in the market and each has its own branded version of things. Even though there is this idea that there should be one standard, there will be more than one type of technology coexisting."

—*Tom Venetis*

Data anywhere model redefines remote access

Continued from page 83

Wireless standards

But along with these different devices will come a set of differing network and access issues. The access needs of a salesperson who is on the road will differ from those of someone who only requires quick access to update the contact database on a Palm device from the database on their desktop.

"Based on the kind of mobility people have, they are going to chose different access types depending on the devices they are using," Egan adds.

Already the remote access industry is seeing several distinct standards emerging, each offering different kinds of mobility, access speeds and flexibility. One of these is Bluetooth, a technology specification offering short range radio links between mobile devices, such as PCs and cellular phones. Bluetooth is often referred to as a cable replacement technology. In other words, Bluetooth will be the wireless substitute for all the cables that people currently use to connect PCs to other devices like cell phones.

A Bluetooth Special Interest Group (SIG) established by Ericsson, IBM Corp., Nokia, Intel and Toshiba is pushing Bluetooth to be incorporated into a variety of devices. The Bluetooth SIG says more than 1,200 companies have joined since it was formed two years ago.

Some analysts have speculated that Bluetooth would falter or at least be slow to gain acceptance without support from Microsoft. The good news for supporters is that Microsoft endorsed the specification and joined the SIG in late 1999. The five founding companies, along with Microsoft, 3Com and Motorola have established a Bluetooth promoter group within the SIG.

Another wireless technology getting a lot of attention is HomeRF, a consumer level open industry specification for wireless digital communication between PCs and consumer electronic devices around the home. It is based around the Shared Wireless Access Protocol (SWAP) that supports both wireless voice and data networking. Approved in the summer of 1997, it was designed to offer wireless transmission speeds of between 1 and 2 Mbps.

A third wireless technology is 802.11 HR (high rate). As of this year, 802.11 HR can offer up to 11 Mbps of data throughput and is the technology employed by Apple in its AirPort, which made its debut with the iBook consumer laptop this summer. (Subsequent hardware releases—the G4 systems and the new line of iMacs—are also AirPort compatible.) There has been a lot of development activity with advancing 802.11 wireless LAN technology. This subject is beyond the scope of this article, but for anyone interested in learning more, the Wireless LAN Alliance Web site (http://www.wlana.com) is a good place to start.

With three seemingly different standards, it would seem the industry is bracing for a messy fight reminiscent of the Beta vs. VHS battle in the early days of home video. But it would be wrong to assume so.

Instead, companies are looking at these standards as complementary rather than adversarial, working together to give people the access they need from the devices they have at hand while on the go. It is expected that in the near future, people will have several devices offering varying degrees of remote access and means of getting at certain kinds of information available on the Internet or publicly accessible networks.

For example, there are currently some concerns about the incompatibility between HomeRF and Bluetooth. Both use the 2.4 GHz (gigahertz) frequency band and will create problems if incorporated into the same device. However, solutions—development of dual mode devices, for example—are currently being discussed.

Michael Moskowitz, general manager for 3Com's Palm Computing Division in Burlington, Ont., says the popular Palm line of handheld devices will soon incorporate the

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Bluetooth standard and will support other wireless standards as well.

"From a handheld perspective at Palm we are interested in standardizing on Bluetooth" Moskowitz adds "Bluetooth will enable you to connect to many different appliances handheld devices and Internet tools in an area"

This means a Bluetooth enabled Palm device could connect to anything from a Bluetooth enabled laptop or desktop, or to a printer or even a refrigerator if it's Bluetooth enabled.

"Picture yourself walking into your house and your Palm device automatically changes the heat warms up the food in the microwave and changes the clock radio" Moskowitz says "Bluetooth will talk to all of these devices, all of these different appliances in your household or work environment."

3Com has incorporated a proprietary solution into its Palm VII device for wireless Internet connectivity This has proved popular with Wall Street stock traders, who now never have to miss an important trade or sale because they are downing a hotdog on the street corner. And with Bell Canada, users can now connect their Palm to their ISP via a digital phone to do a quick bit of Web surfing or to access that important email.

But Bluetooth suffers from one limitation its range is limited to about 10 m (32 8 ft.) at best And the further away one is from another Bluetooth-enabled device the slower the connection speed. That is why companies like IBM and 3Com are seriously looking at the 802.11 HR wireless standard as a way of enhancing the remote access ability of their products while seamlessly making them work with Bluetooth as well

"If you think about it, 802 11 is a LAN access technology with a good speed and without having to plug in a card," says Howard DuLany wireless marketing manager for IBM's mobile systems group in Raleigh, N C

DuLany sees 802 11 HR being integrated into homes hotels and airports where people will need to connect to the Internet through a variety of devices over great distances Plans are already in the making for incorporating 802.11 into various IBM notebooks and other devices These devices could theoretically connect to each other using Bluetooth then connect to the Internet or a corporate network using the wireless standard, without the user having to find a phone or network jack.

Already, 3Com has incorporated 802.11 HR into its AirConnect Wireless LAN solution AirConnect is nearly as fast as a wired Ethernet connection, and with secure data transmission and software for easy configuration, monitoring and management. Using an AirConnect access point anyone can send and receive data within 60 m (200 ft.) of it without being tied to their desk.

"Much like a cordless phone, you can walk around with an antenna out of your notebook and surf the Web or get your email," says Matthew Hickey, manager for system engineering for 3Com in Toronto.

Hickey sees AirConnect as being a good system for the home as well especially for older homes in which stringing wire through the walls for high speed connectivity is impossible AirConnect could then link to the home's dedicated high speed cable or ADSL Internet connection With this type of solution one can imagine a totally connected home where you could use a Palm device to check

Continued on page 88

Symantec offers trio of remote access solutions

Symantec Corp (http://www.symantec.ca) has been a long-time player in the remote access market offering several products that make working away from the office and keeping in touch easier

Currently Symantec has three remote access products Mobile Essentials, pcTelecommute and pcAnywhere

Chris Monnette, Canadian general manager for Symantec in Toronto, says his company's goal is to make access to the Internet and to remote networks as safe and reliable as possible

For example pcAnywhere offers security features that allow users to set password protection, encryption levels, restrict drive access keyboard locks and set file transfer rights Each of these can make remote unauthorized access to data more difficult.

Virus protection is a key feature of pcAnywhere and will be enhanced later this year to tackle what Monnette sees as one of the biggest virus threats emerging for mobile and remote access users

"Everyone talked about viruses like Melissa last year" he adds "Now going into 2000 the next big security threat will be worms."

Worms are viruses that do not need any human interaction to spread to other machines While a standard virus spreads because someone passes on a corrupted disk to someone else or sends an infected email attachment, Worms don't need such help to spread. Instead they seek out ways to do so on their own. A Worm virus can spread quickly among systems, especially when a system is open to any number of workers accessing it remotely

"Our goal is to make our anti-virus solutions into complete malicious code protection" Monnette adds.

But if security is one pillar of Symantec's remote access goal making sure people can get to networks or the Internet is the central feature of its Mobile Essentials 2 0 product

Mobile Essentials 2 0 offers TCP/IP switching allowing someone to switch network environments without having to enter different IP settings Calling card integration allows mobile users to use calling cards to dial-up to networks or their ISPs. It also offers greater flexibility for setting up default printers dial-ups and email and fax programs.

—Tom Venetis

HP, ExciteAtHome form imaging alliance

PALO ALTO Calif —As part of its new business strategy of aggressively teaming up with the largest e-commerce portals on the Internet Hewlett-Packard Company (http://www.hp.com) has announced an alliance with ExciteAtHome (http://www.excite.com) to provide Web users with a comprehensive destination to learn about digital photography as well as a place where they can gather personal and commercial images from a variety of sources and share digital photos with others via the Internet.

As part of this new initiative to be called Excite Photo Center (http://www.photocenter.excite.com) ExciteAtHome has acquired Webshots, a photo-client Internet download that currently downloads more than 25 million full-screen photo images a month

ExciteAtHome has also entered into a strategic relationship for commercial photography images with Worldprints.com Worldprints has exclusive online distribution rights to the National Geographic photography collection

Antonio Perez president of HP's Consumer Business and Digital Media Solutions, says the arrangement with ExciteAtHome will put HP in the business of warehousing photographs and represents a new business model."

Among the features of Excite Photo Center is the ability for PC users regardless of their expertise to immediately enjoy online photography by creating their own virtual photo albums and storing the pictures online for viewing by family and friends from around the world In addition ExciteAtHome claims that as a result of the acquisition of Webshots and the alliance with Worldprints.com Photo Center consumers will have thousands of commercial images to browse through and select for their personal use

The Photo Center will also provide resource content on Internet photography with practical tips and a shopping guide to purchase photography equipment HP products will be predominately showcased as part of the new alliance with ExciteAtHome

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[illegible]	[illegible]	[illegible]	[illegible]	10X DVD installed
				[illegible]
Win98 KeyBoard / Mouse	Logitech Wheel Mouse / Keyboard	PS/2 Mouse / Keyboard	SB 128 / 140w Speakers	Altec 54w Subwoofer + 4Speakers
3D Sound Card / 140w Speakers	3D Sound / 140w Speakers	3D Sound Card / 140w Speakers	Logitech Wheel Mouse / Keyboard	Wireless KB & Mouse
56K V.90 Voice/Fax Modem	56K V.90 Voice/Fax Modem	56K V.90 Voice/Fax Modem	56K V.90 Voice/Fax Modem	USR 56K V.90 Voice/Fax Modem

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TNT2 / S540 16M AGP	39
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SOFTWARE

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MS Windows98 Upgrade Version SE	129

LapLink 2000 extends remote access

Remote access is not a new topic and several companies have been offering various tools for mobile workers to get at important data for some years. One such company is LapLink.com Inc. (http://www.laplink.com) formerly known as Traveling Software, which has released LapLink 2000, a file transfer and remote control software solution.

Complete access to your PC from anywhere
Server and help over the Internet!
LAPLINK 2000

Mark Eppley, founder and chief executive officer of the Bothell, Wash. based company, says products like LapLink 2000 are still valuable and popular because of the way computing has changed.

Before, people often had a desktop PC at work and home, and if they were lucky had a laptop PC they lugged around occasionally. In the early days, linking the laptop to a network remotely was not a high priority.

"Now you've got a single computer model," Eppley adds. "Instead of a portable and a desktop, you now have a portable as the sole computer, which means you need greater direct access to servers and the Internet both in the office and on the road."

Eppley says the biggest change in the nearly 12 year-old product is the addition of a great number of Internet features. By using the Internet, LapLink 2000 connects not only to the office server and database, but to any other computer running LapLink. This makes file transfers between two systems easier and faster.

Security has also been enhanced considerably in LapLink 2000. It includes folder level security for controlling access to a system and its data, multi-level encryption, and a lock protection.

Eppley sees companies like his continuing to have a place in the market even as competitors like Microsoft try to add similar file transfer, security and Internet capabilities into their offerings.

"LapLink.com has a 12 year history and some seven million customers, and has transferred some 2.4 trillion files over that history," Eppley adds. "And if I had a nickel for every time I heard that Microsoft would put us out of business, I could buy a few cups of coffee."

—Tom Venetis

Knowledge and technology

Continued from page 83

some cases, it may be a small component of the solution; in others it may not be required at all.

Technology steps in

The knowledge management craze has drawn the attention of most hardware and software vendors, systems integrators and consulting firms. It is easy to see how a theory on organizational change has become confused with technology as a result of this onslaught of computer network and Web based solutions.

Despite this confusion, technology has added a valuable dimension to knowledge management, allowing organizations of all sizes to benefit from different methods and techniques to capture and disseminate the wealth of knowledge that is often lost in a company.

According to Eric Alderson, director of business development at Chronicle Technologies Inc. (http://www.chroniech.com) "software is a platform that allows people to transfer their tacit knowledge." Located in London, Ont., the company has developed a Windows-based knowledge management program called YourWorld. It allows users to identify, capture, organize, retrieve and distribute data, information, and knowledge that is shared within a workgroup.

"Computer technologies are increasing inside organizations. Computers are the main interface to a human or HMI [human machine interface]. That's the platform people use in addition to phones, voice mails, fax machines, photocopiers, which are not enough," according to Alderson. "With the introduction of computers people are storing more pieces of knowledge that they've learned [illegible] So the introduction of a computer has allowed people to transfer knowledge. You can access my files and I can access yours. Software is the communication media that is being utilized by businesses."

YourWorld incorporates a visual means of accessing knowledge that is broken down into "knowledge objects" which include documents, scheduled activities

Continued on page 88

YourWorld's main user interface

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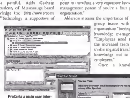
Knowledge and technology

Continued from page 87

incidents, meeting objects, infrastructure, equipment catalogue, user-defined properties, and georeferences. It can capture various types of information, such as documents, graphics, sound and video clips, spreadsheets, or engineering drawings. It can also capture knowledge from lesser-organized sources in more informal categories, such as clues, hunches, instincts, anecdotes, and personal insights. YourWorld has two components. The first is a back end, which is really like a database container, that retails for US$1,000. Small companies typically only need one. A licence for the second component, the front end, needs to be purchased for each computer. The front end lists for US$1 500 per licence.

In addition to companies dedicated to creating knowledge management software solutions, many other vendors invoke the knowledge-management mantra to market business intelligence software, such as "intelligent" search agents, data warehousing, mining and modeling applications, and "push technologies" that can turn a project designed to improve an organization's knowledge gathering and sharing into an information technology nightmare.

Understanding individual and organizational needs first, as well as budgetary constraints, will make knowledge management solutions easier to identify and technology purchases less painful. Adds Graham Westwood, president, of Mississauga based Domain Knowledge Inc. (http://www.processknowledge.com) "Technology is supportive of the knowledge management process because it provides a mechanism in several key areas of knowledge management. In and of itself, however, it is not the whole thing. It just provides a framework which allows you to codify, display, and distribute your knowledge."



ProCarta s main user interface (above), and flow-chart wizard interface (right).

He says the main barrier to use of technology in the small business sector is psychological—the I-don't-have-enough-time syndrome. "There haven't been enough software tools that are easy enough to use. People don't have time to be trained [to use software] anymore. They need tools that are readily available and that can learned on the spot. That has not been the case before and it has been a huge barrier to small business. The cost has also been a big issue," Westwood says.

His company's product is ProCarta, a desktop knowledge-management package that captures, analyzes, distributes, and maintains a company's process knowledge. It retails for US$995. One licence is needed for each computer that is used for content creation, but the resulting information can be stored in HTML, which can be posted on the company intranet and accessed by everyone in the organization—even those without ProCarta on their computer.

Buying advice

Before purchasing knowledge management software, suggests Westwood, there are several things to consider. He advises small business operators to first consider what uses they have for their knowledge, after which they can get the technology to support their organization's strategic direction. "There is no point in building this library of everything that's ever been done in the business and saying, 'now we've done something.' Understand why you're doing it. Make sure that the technology is appropriate to your capabilities. There is no point in installing a very expensive knowledge management system if you're a four person organization."

Alderson stresses the importance of work group teams within an organization "buying into" knowledge management. "Employees need to see the increased team value in sharing and transferring knowledge out to other employees."

Once a knowledge management solution is implemented, there is no guarantee that the technology will be a cure-all. Alderson notes that some of the problems preventing information from becoming knowledge include complex learning curves, departmental boundaries, and inconsistencies in how information is stored and accessed.

Information overload becomes a serious threat when technology floods employees with data from the Internet, intranets, email and push applications. The majority of this information is irrelevant, if not counter productive. "Data becomes information when it becomes relevant to what you are doing. Information becomes knowledge when it is used in the successful completion of tasks, thereby transforming knowledge into actions," Alderson says.

It is a question of quality, not quantity. The quality has a great deal to do with the level to which individuals in the organization use and contribute to the system. "By making data, knowledge and information as accessible as possible," says Alderson, "not only the number of people extracting knowledge and information increases but also the number of people who contribute knowledge and information."

Technology certainly has the potential to make knowledge more accessible, when properly implemented and used, Alderson says. "Access to critical information is needed to make better decisions, which is key in small business." He suggests setting up an effective "knowledge map" will help with the implementation of the software. "Mapping allows companies to access their knowledge in their terms."

Perhaps knowledge management software is best encapsulated by the two Rs: reuse and recycle. These applications allow employees to collaborate on projects by reusing and recycling their collective knowledge.

Technology alone does not manage knowledge. No quantity of software will overcome an organization's innate suspicion about sharing knowledge. By creating an environment in which sharing is encouraged, even rewarded, a business or organization opens the door to valuable technology tools to enhance a knowledge management initiative. Knowledge management applications can help a company tap into vast quantities of information that were previously unknown, unused, or simply ignored. When implemented thoughtfully they can gather, organize, disseminate and store an organization's greatest, and most overlooked asset.

The old adage that knowledge is power holds true. As Alderson puts it, "Knowledge is power but when you share your knowledge to the team and other teams you further increase this power for the company." ❑

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Data anywhere model

Continued from page 85

email in the kitchen by using Bluetooth to connect through the stove, fridge or toaster to the laptop in the living room, which would then wirelessly link to the high speed cable ISP connection.

Data access

While most hardware companies are looking at ways to interconnect the various standards, others think the issue is irrelevant. What is more important is how the information will be presented to someone on the device they are using. While surfing on a notebook is relatively easy, doing so on a cellular phone or a portable device with a small screen is another story entirely.

Oracle Corp. thinks the best way around the standards issues and the various bandwidth concerns is to make the data configurable to the device one is using. That is why Oracle recently launched its Oracle8i Lite solution for the Palm Computing and Psion EPOC platforms.

Danica Pravca, senior marketing manager for server technology for Oracle Corp. Canada in Mississauga, Ont., says Oracle8i Lite will automatically configure the data, or even an application, to the specifications of the device being used to access it. So if one is using a PDA, Oracle8i Lite will present the data in a way that is readable on that PDA device.

Along with the Oracle8i Lite, the Web-to-go and Portal-to-go add-ons provide extra features for remote access users. Web-to-go allows any Oracle8i application to shift between online and offline modes, letting anyone continue using the application even when not connected to the Internet. Portal-to-go ensures that database and Internet applications can be accessible to the portable device.

"You don't have to reconfigure data anymore," Pravca adds. "As long as you have a browser [on a portable device], you can take that information and check your own stocks, order airline tickets or do your expense report. Anything you would normally have done in the office, you can now do externally." ❑

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Windows 2000

Coming soon to a server (or desktop) near you

By Jacques Surveyer

To say that Windows 2000 (originally called Windows NT 5 0) is important to Microsoft is to state the obvious. It is the operating system Microsoft hopes will propel it to the same dominant position in enterprise servers that it now enjoys with Windows 95/98/NT on the desktop—a commanding 88 to 90 percent share of the market

The challenge

But between lip and cup is the potential for three critical slips

First, the codebase expands from about 20 million lines in Windows NT 4 0 to well over 40 million lines in Windows 2000 NT has been the most availability challenged of network operating systems due in no small part to device driver amends and simple reboots required of Windows NT at installation, or reconfiguration by third party and Microsoft applications. Given this history Windows 2000 will be subject to much scrutiny for potential impacts on reliability and availability

These performance questions arise at the same time organizations are trying to compete for customers on the Web using enterprise servers, where reliability and scalability are critical issues. However, even more crucial is the fact that Windows 2000 will be released Feb 17 right in the midst of the anticipated widespread Year 2000 (Y2K) transition period. Even organizations in North America—which by all assessments are best prepared for Y2K programming problems—may be understandably reluctant to take on a new and ambitious operating system during this crucial juncture

Second due to the larger codebase and some ambitious features in security, directory service and new enterprise transaction processing capabilities, Windows 2000 is anywhere from one to two years late depending on who does the counting. The important point is that the lateness of Windows 2000 has given its competitors, such as Novell Netware 5 I (which won Best of Comdex 1999 for networking software) Sun Solaris, and Linux an opportunity to catch up.

And as we have already seen in an earlier review of these operating systems (see *The Computer Paper*, January 1999), competitors to Windows 2000 have used the opportunity to not only pull up (or forge ahead) in functional features, but also to fill in the gaps on ease of use and simplicity of administration, which heretofore was a distinguishing feature of Windows However, as we shall see, Windows continues to enjoy price advantages.

Third for the past year and a half Microsoft has chosen to litigate rather than settle antitrust charges brought against it by the U.S Department of Justice Recent findings of facts by the presiding judge have substantially ruled in favour of the government Some legal experts say if the case is not settled before the judge's final ruling, it could linger on in the courts for two or three more years A lingering antitrust suit is thought by many to have played a huge role in IBM's fall from prominence Analysts cite the lengthy antitrust case of the '70s and early '80s for sapping IBM management strength and attention from the real issues—the emergence of PCs, networks and distributed computing—allowing other IT vendors to develop and deliver superior strategies and products to customers. The same crisis of management attention could plague Microsoft as we cross into the next millennium.

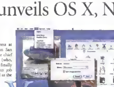
Counterpoint

However in typical Microsoft fashion, Windows 2000 is targeted to meet and master many key enterprise issues—availability, manageability, reliability, scalability and security—head on.

At his keynote address at Comdex Fall/99, Microsoft chief Bill Gates did a scalability and reliability demo of a Windows 2000 Web site being developed for the Ford Motor Company The site was percolating along at about 4,200 page hits per minute when one of six processors was yanked from its rack mount With barely a blink, the *Continued on page 99*

Apple unveils OS X, Net strategy

Compiled by TCP editors with files from Newsbytes



During his keynote address at MacWorld Expo, held in San Francisco Jan. 5 8, Apple chief executive officer Steve Jobs (who, according to Newsbytes has finally dropped the "interim" from his job title) unveiled Mac OS X as well as the company's Internet strategy That strategy includes a new category of Internet services, iTools a redesigned Apple Web site and a multi-year partnership with Internet service provider (ISP) EarthLink (the latter will, initially, only be available to Mac users in the U S)

Mac OS X

In addition to including what Apple (http //www apple com) calls "state of the art technology" throughout Mac OS X also sports an entirely new user interface called Aqua. Apple says the new OS is easier for neophytes to use while simultaneously including more functionality for professionals

Apple says Aqua is a major advancement in user interfaces, featuring the Dock for organizing everything from applications and documents to Web sites and streaming video Aqua also sports a new Finder that simplifies storing, organizing and retrieving of files, and unifies these functions on the computer and across LANs and the Internet

As with all things Apple, some considerable effort has been taken with Aqua's appearance, which includes luminous and semi transparent buttons, scroll bars and windows, and features fluid animation to enhance the user's experience

Aqua features all new 2D, 3D and multimedia graphics The 2D graphics are performed by Apple's new Quartz graphics system, which is based on the PDF Internet standard. It features on the-fly PDF rendering anti aliasing and compositing The 3D graphics are based on the OpenGL standard, and the multimedia is based on Apple's own QuickTime standard.

The company says that Darwin Apple's advanced OS kernel is at the core of OS X Darwin is *Continued on page 93*

Updates improve Linux distributions

You just get nicely settled into your Linux installation and, whoosh, it's out of date Linux maintains a fast paced development cycle that can leave you gasping for breath if you try to keep up with it. The kernel development team adds new features and patches daily gathering them up as "releases" on a regular basis

There are two streams of Linux kernel releases, odd numbered and even numbered ones The odd numbered series, such as Linux 2 3 are experimental kernels—leading edge stuff mainly for developers to test and experiment with, but still buggy and not intended for production. (Anyone is welcome to download these kernels and try them out, of course) The even numbers, such as Linux 2.2, are the "stable" production releases where most of the known bugs have been excised.

But even the production kernels undergo sub series releases Hence we currently see a mix of 2.2 10, 2.2 11 2 2 12 and 2 2 13 kernels as the distribution vendors work towards the forthcoming 2 4 production series.

In addition to the kernel itself Linux packagers use each new distribution release as an opportunity to upgrade versions of libraries and other open source programs and documentation. It's also a convenient time to add things such as new setup and admin features Each distro also has to keep pace with the development of X Window and the various video and sound drivers that have been released since the last distribution.

Small wonder then, that Linux distributions are a moving target Since the start of this column (August 1999) every major Linux distribution has had at least one major upgrade The nice thing about Linux is that it's not necessary to upgrade your system if you're happy with the way things work. But if you're after the latest drivers and support, the upgrades can be attractive. Here's a quick summary of the latest Intel-based updates (note new Linux releases such as Corel Linux and Storm Linux are not included in this roundup).

Slackware Linux 7.0

Slackware Linux (http://www.slackware.com) is the oldest of the current distributions and the one that most clearly retains the flavour of the early days. It derived from the legendary (and now extinct) SLS distribution, one of the first Linux distros It feels the most like Unix in its setup and configuration and it doesn't use RPMs Instead it employs traditional Unix *Continued on page 91*

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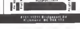

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Updates improve Linux distributions

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TGZ files for package management. The Slackware distribution is primarily the work of a single individual, Patrick Volkerding.

Slackware is highly valued for its stability. It focuses more on working right than on working fancy. For this reason Slackware is one of the top choices for production servers. With release 7.0 Slackware has caught up with other distributions on the desktop as well. Based on the 2.2.13 kernel it offers KDE 1.1.2, GNOME and some new setup tools. Without X Window Slackware can be installed on a minimal system with 16 MB RAM and 80 MB free hard drive space.

Slackware users—and they are many and fiercely loyal—tend to be the kind who don't mind rolling up their sleeves to work under the hood. Slackware is a particularly good release for those who want to study Linux as well as just use it.

Red Hat Linux 6.1

Red Hat Linux (http://www.redhat.com) is the distribution that gets the most press, partly due to its meteoric rise as soon as the company went public, offering shares on the stock market. Red Hat has forged relationships with many commercial vendors, including IBM, SGI, Compaq and Dell. For this reason it is the best known Linux in the corporate world.

Red Hat Linux has always maintained a decent balance between being a good server Linux and a good desktop Linux. It has some of the best auto-probing software, frequently recognizing and setting up video and audio hardware that other distros miss.

Nonetheless, Red Hat has taken some criticism. It is getting top heavy. To have full access to the Red Hat admin tools, you now have to install X Window, which in the case of servers is not particularly desirable. Red Hat has also developed a reputation for releasing to market before the distributions have been well tested. This was the case with 6.0. In many ways 6.1 is a bug-fix release with a few added features including a new graphical installation program to catch up to the competition. Red Hat favours GNOME over KDE—its implementation of KDE is wishy washy.

Based on kernel 2.2.12, Red Hat Linux 6.1 offers a new auto update feature and optional Pentium III optimization. Red Hat Linux 6.1 comes in three versions: Standard, Deluxe, and Professional.

Caldera OpenLinux 2.3

Caldera OpenLinux 2.2 (http://www.calderasystems.com) broke new ground with its graphical installation and auto partitioning. It was the first Linux that didn't scare off non-technical users. OpenLinux 2.3 continues this tradition with Caldera's Lizard (Linux wizard) installation plus Caldera licensed versions of PartitionMagic and BootMagic.

While Caldera OpenLinux can be used as a server, it is packaged primarily as a desktop distribution. Based on kernel 2.2.10, OpenLinux 2.3 includes KDE 1.1.1. The 2.3 release is a minor update, with a number of bug fixes and some new commercial "trial version" packages added.

The overall emphasis in Caldera OpenLinux 2.3 is on graphical management and, for better or worse, shielding users from the Linux command line. It continues to be a useful release to suggest to Microsoft Windows users who are new to Linux and want to try it without making a technical commitment.

SuSE Linux 6.3

SuSE Linux (http://www.suse.com) is the biggest Linux distribution, now spanning six CD-ROMs. Originating in Germany, SuSE is the leading distribution in Europe. Installation and support is multi-lingual.

A slick distro with excellent admin tools, SuSE 6.3 offers a new graphical installation, auto partitioning and better hardware detection, bringing it into line with the latest Caldera and Red Hat releases. The 6.3 release is based on kernel 2.2.13 and KDE 1.1.2.

SuSE packs an enormous amount of trial software onto its CD-ROMs as well as the broadest selection of open source offerings. For this reason SuSE makes an excellent Linux for laptops. You don't need to spend a lot of time downloading software with this distribution—most of what you want is on the discs. SuSE also includes a comprehensive user manual.

Mandrake Linux 6.1 (Macmillan Linux)

Mandrake Linux (http://www.linux-mandrake.com) is based on Red Hat Linux and keeps pace with Red Hat release numbers. Hence the latest is 6.1. It is based on kernel 2.2.13 and it installs KDE 1.1.2.

Mandrake Linux 6.0 won the Product of the Year award at LinuxWorld Expo '99 for its improvements on Red Hat, including a well-installed KDE environment, optimization for Pentium processors, and an auto-update feature. Red Hat 6.1 now includes optimized code and auto update as well, plus a graphical installation that Mandrake does not offer, so Mandrake has lost some of its advantage. It still offers a much better KDE than Red Hat, however.

Mandrake Linux 6.1 is the Linux that forms Macmillan Linux and is widely available in computer and office supply stores under that name.

TurboLinux 4.0

Just as Red Hat is the leading distribution in North America and SuSE is the leading distribution in Europe, TurboLinux (http://www.turbolinux.com) is the leading distribution in Asia. It outsells all other distributions in Japan, China, Indonesia and Korea. It comes in English, Japanese and Chinese versions.

TurboLinux 4.0, based on the Linux 2.2.12 kernel, represents a jump from 3.6. It is offered in three versions: TurboLinux Workstation, TurboLinux Server, and TurboLinux TurboCluster Server. The server version contains a professional version of BRU, a commercial backup utility, while the cluster server package contains utilities and kernel support for setting up a high-performance Linux cluster.

TurboLinux does not have a large following in North America at this time, but the company has formed a relationship with IBM. IBM ships TurboLinux along with its Linux port of DB2 and WebSphere. TurboLinux deploys its own X-based graphical admin tools in an environment it calls TurboDesk, a modified WindowMaker interface. It also offers KDE and GNOME.

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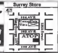

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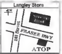

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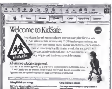

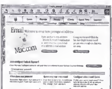

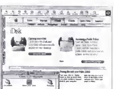

Apple unveils OS X, Net strategy

Continued from page 89

Linux-like, featuring the same Free BSD Unix support and open-source model. Darwin brings an entirely new foundation to the Mac OS, offering Mac users true memory protection for higher reliability preemptive multitasking for smoother operation among multiple applications and fully Internet-standard TCP/IP networking As a result, Mac OS X is the most reliable and robust Apple operating system ever

Apple has designed Mac OS X to enable a gentle migration for its customers and developers from their current installed base of Macintosh operating systems. Mac OS X can run most of the over 13,000 existing Macintosh applications without modification However, to take full advantage of Mac OS X's new features, developers must "tune-up" their applications to use "Carbon", the updated version of APIs (Application Program Interfaces) used to program Macintosh computers Apple expects most of the popular Macintosh applications to be available in "Carbonized" versions this summer

OS X will be rolled out over a 12-month period. Apple says developers have already received two pre release versions, and will have received another—which will incorporate Aqua—by late January The final "beta" pre-release is expected this spring, and the commercial release this summer

iTools

Jobs also spent some time describing Apple's Internet strategy, key to which are iTools—a set of Internet services that the company says takes advantage of Apple's technology on both the client and server ends of the Internet

"iTools offer amazing new ways for Mac users to take full advantage of the Internet," said Jobs. "Mac users can now do things on the Internet that Wintel users can only dream of." iTools are free to Macintosh users running the Mac OS 9, and can be accessed at Apple's Web site. The first four iTools unveiled by Jobs are:

- **KidSafe** Rather than filtering out "bad" sites, Apple says KidSafe allows users to verify that Web sites are appropriate. KidSafe downloads a module into the computer's OS, which automatically verifies that a requested URL matches the more than 50,000 sites that have already received the KidSafe stamp of approval (Apple says more than 10,000 sites are being added to the database each month) All have been vetted by certified teachers and librarians. KidSafe can also disable Internet email, chat sites and games.

- **Mac.com.** This email service gives users an exclusive address on the Internet and works with standard POP email clients, such as Outlook Express, Eudora and Netscape Communicator Apple says Mac.com users can set up automatic replies, forward their email to other addresses, and configure Outlook Express for their Mac.com mailbox from a simple Web page.

Continued on page 94

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Apple unveils OS X, Net strategy

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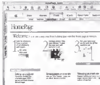
- iDisk. Apple is offering iTool users 20 MB of free storage on its servers, allowing users to store, transfer and share files over the Internet. Apple says it has made iDisk as easy to use as a Mac desktop folder.



- HomePage. This service allows users to set up personal Web sites which Apple will host on its servers. Apple says HomePage sites are created and managed via an easy to use Web page and can incorporate materials such as photos and iMovies from the author's iDisk. The sites can be updated as often as desired.

AppleWorks 6 debuts

Also debuting on the opening day of MacWorld Expo, was AppleWorks 6. Apple says the new version of the integrated word processing, spreadsheet, database and presentation application suite includes more than 100 new features and a new user interface.

The new features include an easy to use presentation environment "where users can quickly create multimedia and then" it integrate text, tables and digital elements such as QuickTime movies and iMovies", more than 150 professionally designed templates, 50 new fonts, and built in Internet content capabilities that allow users to access more than 25,000 clip art images.

AppleWorks 6 requires a minimum of a PowerPC based Apple computer running Mac OS 8 with 24 MB RAM, a CD ROM or DVD ROM drive, and an Internet connection (for accessing clip-art). It should be available in early February for an estimated retail price of US$79. Windows 95 and 98 versions are expected to ship in the spring.

Third-party developments

Following is a list of new and notable announcements made by third party developers at MacWorld Expo.

Umax debuts FireWire scanner • Umax Technologies (http://www.umax.com) took the wraps off the first professional scanner with FireWire (IEEE 1394) support for Mac and PC users—the Umax PowerLook 1100. By using FireWire connectivity—one of the fastest peripheral connection standards to date—the PowerLook 1100 offers blazing data transfer rates, hot pluggable connectivity without the need for a host card, and the ability to connect multiple Macs to streamline workflow according to Umax.

Internet Explorer 5.0 Mac Edition • Microsoft Corp (http://www.microsoft.com) unveiled Internet Explorer 5.0 Macintosh Edition, which it says introduces a new rendering engine and functionality that has "never before been available on any browser of any platform". Microsoft says it plans to release Mac OS X native versions of Internet Explorer, Outlook Express and Microsoft Office. Release dates were not announced, but the company says it expects the new browser will be available in early 2000.

Free CorelDRAW 8.0 LE • Corel Corp (http://www.corel.com/drawfmac_le) announced that Mac users can download CorelDRAW 8.0 Limited Edition (LE) for Mac for free until Mar. 10.

3Dfx to deliver Voodoo directly to the Mac • 3Dfx Interactive (http://3dfx.com) announced its strategy to bring its 3D graphics products to the Mac with branded models featuring the new VSA-100 processor. The company says board products based on the VSA-100, which contains native Mac support and acceleration, will deliver ultimate fill rates and high visual reality through breakthrough digital cinematic effects, bringing Mac gaming to the next level. Additionally 3D rendering quality on the Mac will be dramatically improved through the VSA-100's advanced full scene anti-aliasing technology, a capability never before available from 3Dfx for Mac.

Retrospect to support Mac OS X • Dantz Development Corp. (http://www.dantz.com) announced that its award winning Retrospect Backup software will support Mac OS X as well as future releases of Mac OS X Server.

VXA-1 tape drive configured for Mac • Ecrix Corp (http://www.ecrix.com) announced availability of its VXA-1 tape drive in a configuration developed for the Mac. The external drive—which has been designed to match the new Power Mac G4—will offer two interface choices: a SCSI interface available in February 2000, and a FireWire (IEEE 1394) interface available in the second half of 2000.

iTouch technology for iMacs • Elo TouchSystems (http://www.elotouch.com/) says its iTouch touchscreen technology is now available for use with Apple's iMac computers. The company says the iTouch software, with new features and a "revolutionary lower price point," will make the iMac an ideal all-in-one solution for tabletop interactive displays.

Continued on page 103

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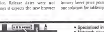

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GoldMine works well on networks

GoldMine is contact management software designed with the workgroup in mind. An individual on a standalone computer can use it quite effectively, but some of its nicest features don't come into play in that situation.

Installing GoldMine on a LAN is not as easy as installing a word processor. In fact, it isn't as easy as installing some other, less powerful contact managers. For that reason, GoldMine is difficult to find at the retail level. It is a product that VARs and resellers typically sell, install, and configure. If you are intent on doing it yourself, however, I can provide some useful information.

First, you will want to buy the appropriate number of licences at a good price. Try Insight Canada or similar sources. You'll get nothing but the software, but the price will be good. Unlike some network software, GoldMine's model is concurrent user licensing. If you buy the five-user version, any five people on the LAN can have GoldMine loaded at the same time. In a typical office, the number of licences required will be less than the total number of users, but probably not by much. Most users prefer to have GoldMine loaded while they are in the office. That's the way I use it, since it is also my email client. There's no sense in over buying, but having fewer licences than needed would be false economy.

Shared database

At the heart of GoldMine is a shared database which needs to be installed on a server that everyone can access. Installing GoldMine on a server presents no particular difficulties. During the installation it is wise to choose the option to install the software required for a workstation installation. More on that later.

GoldMine has its own security scheme. Users need accounts in GoldMine in addition to their accounts on the network. The creation of GoldMine accounts needn't be entirely manual. GoldMine pulls up the list of network accounts, and asks which users should be given GoldMine accounts. This approach saves some typing, and also assures that the GoldMine and network accounts have the same name. The passwords, though, are set independently.

Client side

Once GoldMine is installed on the server, user accounts are created, a database is created in a separate directory and permissions set at the network operating system (NOS) level, it is time to install software on the workstations. There are two ways to do this, and the tradeoff between the methods is easy to evaluate.

The simpler of the two methods is to create a shortcut on the workstation desktop to the GoldMine EXE file on the server. In a Windows 98 computer, you would go to Network Neighborhood, and create a shortcut of the gmw4.exe program file on the desktop. Double-clicking on the shortcut is all you need to do to bring up the GoldMine login screen. By default, GoldMine brings up the same login name that was used to login to the network, but that can be changed. All that needs to be done to complete the login is to enter the password. In an office without any security concerns, GoldMine can be configured to bypass the login screen, but I've never found that to be a good approach.

The second approach to installing GoldMine involves creating an icon as just described, but once GoldMine is loaded, going to the Licence Manager menu within GoldMine, and choosing the option to install the GoldMine program files in a local path. The option to update the files when a newer version is placed on the network can also be chosen. The advantage of installing the program files locally, especially on a slower network, is faster program loading time, but nothing more. Once GoldMine is loaded, performance is the same, since in both cases the program files are totally in memory, and the database files are on the network drives.

While within the Licence Manager menu, you might take a look at the Net Update tab. The administrator can have GoldMine go to the GoldMine Web site (http://www.goldmine.com) to check for a newer version of the software. If one is available, it is downloaded for immediate or later installation. On a properly configured system, the administrator will take away this capability from other users.

Setting up users

GoldMine can store data in a variety of formats. If you have a client/server-style database on your LAN, like SQL Server, Sybase, DB2 or Oracle, you can use that. For most smaller offices, the default dBASE IV format will be fine.

The GoldMine administrator can do all of the user administration by logging into GoldMine from anywhere on the LAN with an administrative account. GoldMine is fairly granular in its approach to user rights and access. By default, most items on the GoldMine menu system are available to every user, but any item can be taken away if required. For example, rights to create new records, edit or delete existing records, or look at other people's calendars, can be taken away. Each menu item is independent of the others.

Security and access issues need to be consid

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Remembering Morita

Sony founder led electronic revolution for over 40 years

By Jeff Evans

As we begin the new century Sony Canada has marked the 20th anniversary of the Sony Walkman, the portable stereo player that changed the way people looked at electronic media and set the stage for mainstream acceptance of handheld electronic devices of all sorts. As we say goodbye to 1999 it is also worth remembering one of the most influential architects of the electronic age, Japanese entrepreneur Akio Morita.

Morita, the co founder and honorary chairman of Sony died in October 1999, after a long illness. He left behind him not only a company that is one of the world's leading brand names but also a world that he influenced through his inventiveness and his determination to bring electronic media to literally everyone on earth.

Born Jan 26 1921 into an upper class family that owned a sake (rice wine) business, Morita's educational background in physics and engineering led to a wartime job developing new technology for the Japanese Navy. Morita was horrified by the damage he saw inflicted by the American fire raids on Tokyo. When Hiroshima was destroyed by an unknown new super weapon Morita knew before it was officially announced that the culprit must have been an atomic device.

When the Second World War ended Morita passed up his chance to run the family firm in favour of starting a new technologically oriented business.

In the spring of 1946, less than a year after the bombing of Hiroshima and Nagasaki and Japan's unconditional surrender Morita and Masaru Ibuka founded Totsuko, a company that eventually became Sony. The new enterprise was literally built on the ruins of postwar Japan. In its early days the staff included engineers and technicians from the defunct Imperial Japanese Navy.

After developing and manufacturing rather ordinary electrical products for consumers, the company took some significant steps towards becoming a technology leader.

Morita and Ibuka's young company invented the first portable magnetic tape recording unit (based on magnetic tape technology from the Japanese Empire's former technology partner, Nazi Germany).

Against considerable resistance from the Japanese trade ministry (which is also famous for trying to discourage Honda from developing a passenger car industry), Sony also obtained the Japanese rights to the newly invented transistor for a sum of US$50,000. Sony went on to invent tiny lightweight electronic devices using the new transistor technology. The Sony portable transistor radio was a huge success and became the basis for the company becoming a globally recognized brand.

The company's leadership in magnetic tape technology and its use of the new transistor technology gave it an international profile. Morita's choice of the word Sony based on the Latin word "sonus," or sound, was a stroke of marketing genius. Morita wanted a brand name that could travel well internationally, and Sony rapidly went on to become one of the most recognizable brand names in the world and one of the most respected.

Morita first traveled to the U.S in 1953, and on the basis of that trip, came to believe that success in the U.S consumer electronics market was the standard for global success. He also established a long and productive relationship with Canada, where Sony's sales were handled for many years by a Canadian distribution company.

Sony's engineering strength was largely responsible for its growing reputation for quality and innovation. The company was granted hundreds of patents for both new technologies and manufacturing techniques. It was the first company to develop techniques for manufacturing precision components to within 1 micron (one millionth of an inch) tolerance.

Morita's genius was to see potential markets for new electronic products, to inspire his

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Remembering Morita

Continued from page 97

engineers, and to market the resulting products brilliantly across cultural boundaries.

Sony became the standard for video technology, and developed the first truly portable broadcast quality video camera/recorder in the early 1970s, specifically to meet the requirements of U.S television news reporters working in Vietnam War. This invention made Vietnam the first "television war" bringing the ghastly reality of that war home to Americans for the first time

Morita was also an extremely effective diplomat, cultivating personal relationships with the corporate and political elite in the West, particularly the U.S

He visited the U.S regularly, and lived in New York with his family for one year. He learned to speak English, though not entirely grammatically correct, with great style and expressiveness, and strove to understand the U.S., and to help the U.S understand Japan.

Perhaps the one product that identifies Sony in the public's mind, however is the Sony Walkman, the portable stereo audio player that has sold over 186 million units worldwide, and inspired hundreds of millions of copies by other competitors

Morita was one of the originators of the Walkman concept and strongly backed its development team in the face of opposition and ridicule within Sony and from some of its international sales partners. Morita also pushed for the Walkman name itself an English term that Sony invented.

The Walkman was officially released over 20 years ago, on July 1 1979. It has since undergone continuous evolution, with CD, DAT, and MiniDisc versions supplementing the original magnetic cassette tape player. An all digital Walkman, using Sony's Memory Stick technology is expected to be released in Canada in mid 2000. This new Walkman will allow users to download music from a PC onto a Memory Stick, which is then inserted and played on a digital Walkman.

Sony has also introduced a new commemorative edition of the Walkman, an ultra compact unit available in Canada for $299

After a disabling stroke in 1993, Morita was forced to give up his active role as the public face of Sony

Morita is probably impossible to completely replace, but over the past several years, under the leadership of a new president, Nobuyuki Idei Sony seems to have redoubled its innovative vigour. The company is now a world leader in "convergence," the integration of all traditional media using computers and digital technology, and a seemingly endless stream of new technologies continues to pour out of its research labs.

At a critical period in the modern era when the world really began its transformation into an electronic global village Morita did much to build bridges between Asia and the West. He tried to encourage a mature relationship of equals between Japan and the U.S., contributing a section to the book *The Japan That Can Say No* in which he urged Japan to take responsibility for establishing a more independent relationship with the U.S.

By developing the Sony brand Morita largely defined the international perception of Japanese industry as a standard setter for quality and innovation, which all other electronics manufacturers have had to strive hard to match.

Morita was a unique asset to postwar Japan, an independent, often contrarian thinker who dealt brilliantly with technology, business, and international and inter-cultural relations. He tried to increase Japan's understanding of other nations, and encouraged the rest of the world to better understand the Japanese people, with great success. ❑

Wired for work

NB—A Web site its creators call "an Internet bulldozer" leveling the playing field between large and small businesses has been unveiled in with the aim of helping workgroups collaborate and communicate no matter where they are located. WorkWired.com offers free access to a customizable pallet of news and information, plus tools to create public and private groups for coordinating schedules or project management and for sharing industry research. Coming soon says WorkWired's chief executive officer Ron Reed will be integrated email, voice-mail and fax, plus opportunities for buyers and sellers to arrange business-to-business e-commerce.

http://www.workedwired.com

GoldMine works well on networks

Continued from page 96

ered carefully. Although it is possible to create any number of databases, it is usually better to deal with just one, since GoldMine doesn't make it possible to search or run a report on more than one database at a time. However, if everything is in one database the security needs to be tuned so that all users are comfortable with what other users can see

GoldMine supports the creation of user groups. If the administrator does this efficiently it will be easy for users to fine tune access to their records. For example, suppose I create a new contact record. By default everyone can see all of that record, but I can make the record totally private or I can restrict access to any group of GoldMine users.

I can also go one step further. The record can be made totally invisible or partially visible to users without access. There is no latitude in determining what "partially visible" means. It means that all data is hidden, except for the fields containing the name, title, and company of the contact, as well as phone and fax numbers. GoldMine provides an appropriate level of security and access if it is configured properly. If you need more flexibility than GoldMine provides, you will need to look in a different, and far more costly category of software

I use GoldMine 4, which is what I've based my comments on. GoldMine 5 will be released very soon. I will continue my discussion of configuring GoldMine on a LAN next time, and I hope to be able to include an update on what's been changed and added in GoldMine 5. ❑

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Windows 2000

Continued from page 89

automatic failover capabilities in Windows 2000 and IIS overcame the hitch flawlessly

Likewise, Microsoft president Steve Ballmer promised better performance in Windows 2000 with the eradication of reboots and other deterrents to high availability

Finally, former partner IBM has been touting Windows 2000 readiness by not only preparing all its software for Windows 2000 certification, but by also having 900 engineers already trained in advanced Windows 2000 features. So this review will assess for individuals, small businesses and larger organizations how successful Windows 2000 has been in achieving the goals of delivering an enterprise class operating system

Windows 2000 basic facts

Like Gaul, Windows 2000 can be divided into three parts Windows 2000 Professional is the desktop version for PCs and workstations Windows 2000 Server is the work group server edition for use in small offices and departments to serve anywhere from five to 500 users Windows 2000 Advanced Server is designed for use in enterprises with either thousands of users or large databases with tens of thousands of users connected directly or via the Internet

There is also a fourth delayed version of Windows 2000 the DataCenter edition, which will support up to 32 symmetric multi processors, have advanced clustering with failover capabilities and the new 64-bit memory management capabilities It will not be available until at least nine months after the release of the other editions of Windows 2000

In our full review of Windows 2000 (which we'll begin once we have the final product), we will run benchmarks and tests with Microsoft and other application software We shall also make the natural split between Windows 2000 Professional (the workstation version) and the two Server editions. As you can see from Table I, Server and Advanced Server have many of the same features. The main differences are in scalability features involving different levels of support for Symmetric Multi-Processing (SMP) 64 bit memory and clustering services But let's examine each issue in detail.

Pricing

The first notable thing about Windows 2000 is that its pricing has drifted upward. At a list price of $472, Windows 2000 Professional is just a bit more expensive than Windows NT 4 0 But on the Server side the price is substantially higher A 10 user licence for Windows 2000 Server is $1 774 whereas a 20 user license for Windows NT 4 0 has a street price of $982. In addition, the memory and disk requirements have also increased However that would be expected with many additional functions and services (see Table I)

Windows 2000 services

There are six major categories in which Windows 2000 has improved its services Microsoft has emphasized Active Directory Services (ADS) as being the crown jewel ADS allows Windows 2000 to compete more closely with Banyan's StreetTalk and Novell's NDS In fact, Microsoft believes ADS will ignite the market for directory services As Table I shows, ADS goes well beyond the local server with group policy and LDAP industry standard support

A Jet database engine can support millions of users with advanced profiles, including Intellimirror custom local user backup and support, plus upcoming Exchange 2000 integration The downside to ADS is that it requires extensive planning for installation and/or migration. As well ADS features and functionality do not yet match StreetTalk and NDS, which have been installed for two or more years But like Novell's NDS this is bet the business software from Microsoft so do expect constant improvements and integration into the whole product line.

The next area Microsoft is focusing attention toward is Windows 2000's Internet Services In this area, Windows NT 4 0 has a mixed reputation It has clocked some of the fastest Web page service times in the industry on Intel boxes, and it has a wealth of top notch development tools The reliability and availability of Windows NT 4 0 plus IIS, however leave a lot to be desired (see *Network Computing* Oct. 4 1999 review for details)

Scalability is also an issue with Windows NT 4 0 maxing out at four symmetric multi processors with two way clustering Finally, Microsoft simply does not support a lot of Web-development standards such as Java 2.0, JDBC, CORBA and the like except through third party software Fortunately Windows 2000 addresses many of these issues (see Table 2)

In the area of reliability and availability, Windows 2000 is getting at some of the key culprits: reboots required by the OS, clashing DLLs, memory leaks and failing device drivers. But even Microsoft's Office 2000 still requires at least two reboots on install, and one on reconfiguration

The Certified for Windows 2000 program tries to address these issues The problem is that less than two percent of software is fully certified at the time of this writing (early December 1999) Microsoft officials say that number will soar as Feb 17 approaches, but all of its own applications have yet to make the grade.

Reliability and availability of Internet Services are crucial for Windows 2000 because a company's Web site is its interface to its customers, suppliers, employees and other stakeholders. Companies cannot afford Web site downtime On the other hand, the new code represented by ADS, COM+ Security and other services doubles the size of Windows NT codebase from 20 million to 40 million lines in Windows 2000

Many consultants are recommending that Windows NT Web sites looking for better reliability and availability move to Windows 2000 in increments, delay implementation of ADS, COM+ and/or other "riskier" services while reaping the higher availability and security of core Windows 2000

Finally for scalability Windows 2000 will supply an increase with support for eight SMP processors (up from four), better file performance with NTFS 5, and clustering services that will be most welcome to Internet service providers (ISPs) As well, IIS5 will have better failover and runtime tuning

But the DataCenter Server version of Windows 2000, with support for 32 SMP processors and advanced clustering, is delayed anywhere from three months to a full year depending on who you talk to. So dramatic improvements in scalability not just for Internet, but all Windows 2000 users, are coming—the question is when

One of the key advantages of Windows NT has been the comparative ease of installing and managing the OS However, competitors are catching up in both these areas. In response, Windows 2000 adds key features with a consistent look and feel for its Microsoft Management Consoles and more remotely accessible administrative functions. The only downside that consultants warn of is that computer operators will have to be retrained because the new look consoles and administration are more sophisticated than ever before

Likewise, in the security arena, Windows 2000 provides a number of enhanced security features, such as Kerberos and PKI which provide a higher level of protection and more convenient "once only" logon authentication for most services This will be important in distributed applications where resources can be spread all over the network. The only downside is that Windows 2000 security features require Active Directory and therefore desktops using Windows 2000 Pro (since they are not in Windows 9x) So again, organizations will have to make a trade off—choosing advanced features or safe migration.

COM+

Some analysts are saying COM+ is the surprise of Windows 2000 But this does not do justice to other System and User services, such as NTFS improvements with disk quota support enhanced text search and indexing functions plug and play, power management and removable remote storage support These improvements will continue to make Windows one of the more convenient environments to connect to.

However there is no denying the importance of COM+ to Windows 2000 This is partially because Microsoft has chosen to ➤

Table 1

Windows 2000 Versions

	Professional	Server	Advanced Server
Pricing			
New version	$472	$1,774/10 users	$5,919/25 users
Upgrade	$324/$221	$987/10 users	$2,959/25users
Hardware Requirements			
Memory	96 to 128 MB	256 MB to 2 GB	512 MB to 4 GB
Free disk space	350 to 600 MB	450 to 750 MB	500 MB to 1 GB
Advanced Directory Services (ADS)			
ADS Interfaces 95/98/NT	yes	yes	yes
ADConnector to Exchange 5 5	no	yes	yes
ADS Domains/Trusts SnapIn	no	yes	yes
ADS Users/Computers SnapIn	no	yes	yes
Group vs. Local Policy admin	no	yes	yes
LDAP 3 (as defined by IETF)	yes	yes	yes
Internet Services			
Dynamic DHCP in DNS, ADS	no	yes	yes
Internet authentication service	yes	yes	yes
Internet connection sharing	yes	yes	yes
IIS5 (Internet info services)	no	yes	yes
Network address translating	yes	yes	yes
Quality of service Web media	yes	yes	yes
Routing and remote access	yes	yes	yes
VPN (virtual private networks)	client	server	server
Management and Administration			
Graphical disk management	yes	yes	yes
Intellimirror auto configuration	only client	server	server
Management console (MMC)	yes	yes	yes
Remote installation services	client only	server	server
Safe mode startup	yes	yes	yes
WSH (Windows Script Host)	yes	yes	yes
Security			
Certificate services	standard	custom	custom
Encrypting file system	yes	yes	yes
Internet protocol security	yes	yes	yes
Kerberos single logon	yes	yes	yes
Layer 2 tunneling protocol	yes	yes	yes
PKI and SSL support	yes	yes	yes
System Services/COM+			
ATM (asynchronous transfer mode)	client	client/server	client/server
Clustering servers	no	no	yes
Component services	yes	yes	yes
Enterprise memory arch	no	no	yes
Message queuing	yes	yes	yes
Multi processor support	2 way	4 way	8 way
Network load balancing	no	no	yes
TAPI 3 0 telephone API	yes	yes	yes
Terminal services, CITRIX	no	yes	yes
User Services			
Disk quota support	client	client/server	client/server
Indexing text search services	yes	yes	yes
Other OS support, integration	Wins	Mac, Wins	Mac Wins MF
Plug and play	yes	yes	yes
Removable and remote storage	yes	yes	yes

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bypass some key industry standards for distributed development in the form of CORBA, EnterpriseJavaBeans, Java 2 Enterprise Edition and others (although third parties certainly support these methods and standards on Windows 2000).

COM+—which is comprised of Microsoft Transaction Services, Microsoft Message Queuing, Distributed Component Object Model (DCOM) and OLE DB—adds among other things, asynchronous processing, publish and subscribe, plus highly automated load balancing services to basic development capabilities. These are services Microsoft describes as "scaling out."

There are several challenges associated with COM+. First and foremost, the software to build COM+ really awaits the next edition of Visual Studio, which is due "60 days after the rollout of Windows 2000." If developers are willing to work with a beta version of Windows 2000, and a beta version of VC++, they can get started now with COM+, ADS and Kerberos, which are tightly linked.

Second, because of the lack of development software, the reliability and performance of COM+ relative to competing technologies such as CORBA, Java, and other application development methods is simply not well known.

Third, COM+ provides some new and unique features, but there are also delays and gaps in its feature set. Developers will have some hard choices to make. The bottom line is that COM+ is a promising but also emerging technology whose full features and capabilities await the release of not just Windows 2000 but also Visual Studio 7.

Price performance and the bottom line

Traditionally Microsoft has been low cost OS software, but this changes with the release of Windows 2000 (see Table 2).

On the desktop, Windows 2000 Pro cannot match the best price for Linux at $0. On the server side, Windows 2000 Server also is $260 more than the best price for a competitive server—Netware 5.0.

And with Microsoft changing to charging by per permitted user rather than by per concurrent user (companies must pay for all qualified users not just the maximum signed on) the cost of server side ownership will increase for most organizations. But Microsoft still has a price/performance card to play. It can argue that the Wintel platform provides the lowest total cost to deliver equivalent enterprise services. Microsoft can point to the TPC (Transaction Processing Council) benchmarks that show a Compaq server running NT and Back Office being less than one-third the price of its nearest competitor, an AIX based system from IBM. Thus for bringing bargain basement Wintel costs to the mid-size to near enterprise range of computing, Microsoft can afford to take a bigger chunk of the IT pie.

However there are some problems here. First, Linux not Windows is the lowest cost desktop OS on Intel. And with Caldera and Corel Linux matching Windows for ease of installation and use (and Corel Linux throwing in the kicker with its WINE emulator, which can run many Windows applications) in the past six months, Linux on the desktop has become a much more attractive option to both home and corporate users.

Second, and perhaps more telling, most organizations know that the purchase price of systems are a fraction (about 15 percent or less) of the total cost of the system. The biggest costs are development and/or operational expenses. Here such factors as manageability, ease of development, scalability and reliability are crucial factors—and as we argued in our discussion on COM+ and ADS, the jury is still out on how effectively Windows 2000 delivers in these areas.

So like Windows NT 3.3, Windows 2.0 or DOS 4.0, Microsoft has in Windows 2000 delivered a product that it's not an overwhelming, no brainer choice. Just the opposite. There are a lot of trade offs and "wait and sees" associated with Windows 2000. In fact talking with consultants, who are looking to make a lot of money on Windows 2000, their almost universal advice is to be smart about it. Study and plan what, when and how much to buy into Windows 2000. ❑

Table 2

Windows 2000 vs. the rest

	Windows 2000	Other OS
Availability and reliability		
99.999 % (down 2 to 10 min./year)	single app. sites	Netware: out of box
99.99% (down 2 to 10 hr./year)	tuned systems	Unix: out of box
Reliability enhancements	much fewer reboots	Netware: kernel thread
	and saver drivers, DLLs	Unix: better SMP
Scalability		
SMP number of processors	8 way*	Netware/Unix: 32
Advanced clustering	Some in Adv. Server*	Netware/Unix: yes
Transaction service/queuing	yes/yes	Netware/Unix: third party
Manageability		
Graphical disk management	very good	Netware: very good^ Unix: good
Remote administration	very good	Netware: very good^ Unix: good
Security		
Authentications from logon	yes	Netware/Unix: yes
PKI and Kerberos support	yes	Netware/Unix: third party
Price/performance		
Best desktop price	$221/user	$0 (Linux)
Best 10-user server price	$887	$620 (Netware)
Top TPC benchmark	$15/TPC	$52/TPC (AIX)

Notes

* Changes when DataCenter version of Windows 2000 becomes available
Unix – average of Linux, Aix, HP/UX, SCO/Unix and Solaris features.
Netware – Netware 5.1 features
^ – ZenWorks and other services cost extra

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3Com chief sees a wireless world

LAS VEGAS (NB)—Citing the projection that there will be one billion cell phones in use around the world within the next three years, Eric A. Benhamou, chairman and chief executive officer of 3Com Corp. gave his vision of the future as one of instant interconnectivity between people and information.

Benhamou explained how increased access to information and people would integrate into everyone's daily lives.

At the opening keynote address for the Consumer Electronic Show (CES) 2000 in Las Vegas in early January, Benhamou cited the Internet as both the symbol and catalyst of fundamental changes in lifestyles. Benhamou predicted that each person will lead a more connected life in the new millennium and that, for the most part, this interconnectivity would be via wireless technology.

The only hurdles standing in the way of what Benhamou described as "pervasive networking" were the simplicity and reliability of the devices used to achieve it. In a candid moment, he admitted that his industry has made products that were not always so simple or reliable. But, "We'll figure it out," he said.

Benhamou said we are now living in an "e" world—with e-commerce, e-services, e-everything—and that "e-anything requires a network."

Benhamou gave examples the impact that even a simple network could have on a middle class family. It would allow them to share and synchronize information, access personalized entertainment, and remote conferencing, all at the same time and all from home or anywhere a family member might be.

The technology for this network, he said, is already available off the shelf, and all that is required to make a home network feasible is the availability of broadband access, which he called the "key enabler."

Today about two million homes have broadband access, he said. But Benhamou expects that number to rise to between 25 and 30 million within the next three years as "applications drive usage."

While Benhamou said that all the technology needed was available today, one item he displayed has only just completed 1th tests and is about to go into field trials. The device, which looks and functions as a normal desktop telephone, can be customized to suit the needs of different individuals.

For example, by wirelessly beaming the telephone with a Palm Pilot handheld computing device, the phone would be programmed to ring on calls directed to the Palm Pilot user. He said transmission of the telephone call would be via the Internet. He expects that this phone would be sold or made available to consumers through Internet service providers (ISPs) and/or application service providers (ASPs). Benhamou said he did not expect telephone companies would thrilled with this product, which he called an example of "deregulation by devices."

Benhamou hinted at another product being developed by 3Com, which he would only describe as an Internet appliance that would, like the Palm Pilot, be a "true breakthrough."

A home network requires no special wiring, according to Benhamou. Regular telephone lines in use today are sufficient in combination with a product like 3Com's Home Phone Lines Wiring Kit.

There are also two types of wireless home networks, Benhamou said. The first, the A211 standard, is in common use today. The second, which is still in development, is Bluetooth, which will allow different types of wireless devices—Palm Pilots, phones and pagers—to share information and create what he describes as a Personal Area Network.

Benhamou said he also recognizes that with increased connectivity comes several issues that needed to be addressed. Just because people could connect with one another doesn't mean such connections would be harmonious. He admitted that there has been little research in this area, and that the human brain will need to be retrained to assimilate the additional information with which it will be bombarded. We will have to change the way we think and the way we educate children, he cautioned.

Benhamou also stressed that being well connected is not the same as being in a good relationship. Good relationships must pre-exist interconnectivity, he stressed.

According to Benhamou, there presently exists a "digital divide"—an ever widening gap between Internet access and skills that exist in communities. He said lower income earners tend to be on the wrong side of the divide. "It's hard to envision a harmonious society if such a gap exists," he said.

However, Benhamou left his audience with a final positive prediction. Everyone will become more connected and it will improve the quality of our lives. ❏

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Apple unveils OS X, Net strategy

Continued from page 94

Harman Multimedia unveils iSub • Harman Multimedia (http://www.harman multimedia.com) has announced that its iSub six-inch subwoofer with a powered 20 watt amplifier will be available from the Apple Store starting in February. The company says the iSub, which was designed exclusively to work with Apple's newest iMacs, is the only USB subwoofer available for all in one personal computers. Like all things iMac, the iSub features a translucent plastic case.

Live collaboration from HorizonLive • HorizonLive.com (http://www.horizonlive.com) has unveiled HorizonLive 2.0, a product that allows live collaboration on the Mac. The new release includes a white boarding application as well as the new LiveApp component, which allows viewers to see their presenter's applications in real time

USB data acquisition for Mac • Data Translation (http://www.datx.com) announced that the DT9800 Series, a family of USB function modules for data acquisition, is now available for the Mac. The company says the easy to use, plug and-play products are built specifically to embrace USB specifications

Iomega ZipCD Mac compatible • Iomega Corp. (http://www.iomega.com) says its ZipCD external USB CD RW drive is now Mac compatible. The ZipCD external USB drive will be the first in Iomega's CD RW line to be Mac compatible

Meeting Maker to support OS X • Meeting Maker (http://www.meetingmaker.com) says future versions of its products will include both client and server Mac OS X solutions. The company says its been working closely with Apple to provide end users with a group scheduling and calendaring solution that combines the proven strength of UNIX with the simplicity of the Mac

MathXpert assistants for the Mac • MathXpert Software (http://www.mathxpert.com) unveiled Mac-compatible versions of its popular step by step problem solving math software for students in Grades 6-12

Xircom links Visor to AirPort • Xircom Inc (http://www.xircom.com) has demonstrated the first wireless networking capability for the Handspring Springboard expansion platform. Xircom worked with Handspring and Lucent's Bell Labs research and development unit to co develop a prototype Springboard expansion module, based on Lucent's wireless networking technology that will allow someone using a Handspring Visor handheld PC to browse the Internet via Apple's AirPort network. ❑

Updates improve Linux distributions

Continued from page 91

Debian GNU/Linux

The only major distribution that has not released an official update at the time of this writing is Debian GNU/Linux (http://www.debian.org/). Because it has been on the verge of a major production release update for several months, I'm anticipating its jump to the Linux 2.2 kernel by the time this column reaches print

Debian GNU/Linux is similar to Slackware Linux in that it can be easily set up as a minimal installation on a server with no X Window components required. It also makes a solid graphical workstation

Debian GNU/Linux is the only non-commercial Linux distribution. It is maintained by volunteers across the Internet in a manner parallel to the Linux kernel development team. It is philosophically dedicated to the concept of truly "free" software. As with Slackware, it tends to be a conservative release, more focused on working correctly than on adding bells and whistles

Debian uses DEB packages rather than RPMs and it was the first Linux distro to offer auto updating features. It is one of the most robust distributions of Linux though its installation procedure is lengthy and peculiar

As a tribute to its excellence, Debian has been picked as the underlying Linux for two commercial distributions, Corel Linux and Storm Linux, both of which have added graphical installation procedures and management packages. Both Corel and Storm have used the "experimental" 2.2 kernel release of Debian (code named "potato") in their distributions, in advance of an official move to this level by Debian itself. This release will form the basis of the official Debian release once the development team considers kernel 2.2 to be sufficiently stable. (Now that's conservatism with a capital C!) ❑

Gene Wilburn (gwilburn@home.com) is a Toronto-based IT manager, musician and writer who operates a small farm of Linux servers. Back issues of this series are available on his Web site at http://www.northernjourney.com

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Me, myself and my avatar

When the book *Snow Crash* debuted in 1992, the World Wide Web was still in its infancy and author Neal Stephenson's vision of an online world in which people met, dated, partied, and even conducted business through avatars seemed as far fetched as the "consensual hallucination" of the Internet that William Gibson conjured up in his 1984 novel *Neuromancer*.

By Tom Venetis

> *"As Hiro approaches the Street, he sees two young couples, probably using their parent's computers for a double date in the Metaverse, climbing down out of Port Zero, which is the local port of entry and monorail stop. He is not seeing real people, of course... The people are pieces of software called avatars. They are the audiovisual bodies that people use to communicate with each other in the Metaverse."*
>
> —Neal Stephenson, *Snow Crash*

Just as author William Gibson's cyberspace was grounded in the reality of what would later become the Internet, the avatars in Stephenson's *Snow Crash* have existed, in one form or another, before he began writing about them.

"The very first avatar system was created in 1985 at Lucas Film," says Bruce Damer, founding director of the Contact Consortium and president and chief executive officer of Digital Space Corp in Santa Cruz, Calif. "It was created on the Commodore 64 computer to allow people to share a sense of story space, to be able to type to each other and take each other on quests in quite simple virtual worlds. In a sense, it allowed them to interact socially."

Damer says that while the virtual world and avatars created at Lucas Film 15 years ago are very crude by today's standards, they nonetheless showcased the basic elements and appeal that avatars and virtual worlds have for many people. It is the ability to represent oneself virtually and to interact socially with others in a world that goes beyond anything an ordinary online chat session can provide.

Certainly another part of their appeal is that one's avatar can be anything one wants it to be, something Stephenson recognized in *Snow Crash*: *"If you're ugly, you can make your avatar beautiful. If you've just gotten out of bed, your avatar can still be wearing beautiful clothes and professionally applied makeup. You can look like a gorilla or a dragon or a giant talking penis in the Metaverse. Spend five minutes walking down the Street and you will see all of these."*

Damer is something of a guru in the avatar and 3D virtual worlds community. His company, Digital Space Corp., hosts the annual online Avatars Conference and he is the author of *Avatars!*, a guide through the emerging avatar universe. His interest in avatars and virtual worlds began in the early '80s when he began fiddling with computers, thinking they might provide a way to create

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I can see clearly now

TrueSpectra paints a better e-commerce picture

By Jeff Evans

Even as online commerce continues to grow at a phenomenal rate, one of the major roadblocks that remains—in addition to online privacy and fraud concerns—is how to give consumers a better look at the products they are contemplating buying.

A grainy, low-definition thumbnail picture of a wallpaper pattern, ski jacket or landscape print you're interested in may not be enough to base a purchase on. Yet, it's difficult for online merchants to put up digital pictures of all the products in their catalogue, in all the conceivable resolutions and file sizes to suit all of their potential customers.

For the online version of its holiday Gift Book, Sears Canada (http://www.sears.ca) needed to have pictures of 1,000 catalogue pages formatted for publishing online, in addition to many thousands of other images of Sears products. This is a monumental task for a Web graphics production and programming department.

A Canadian startup company TrueSpectra (http://www.truespectra.com), has been working for most of the '90s to develop the technology that gave Sears a winning solution to its massive online graphics needs. TrueSpectra's image server allows almost unlimited numbers of digital images to be dynamically managed, resized and modified for display on a Web site, with a minimum of time-consuming intervention by a graphic artist.

Some of the company's customers claim that the TrueSpectra image server system reduces the production time of preparing images for the Web by 75 percent. The image server allows bitmapped images, structured graphics, and text to be mapped to a Web page via a "dynamic image URL." A high resolution TIFF version of the original image is stored on the image server, and dynamically adapted to the needs of the Web site on the fly. For example, a wide variety of different resolution versions of the image can be called up and viewed by visitors to the site, starting with a low resolution thumbnail, which can transform into higher resolutions for more detailed inspection.

For Blockbuster Video's Web site, TrueSpectra automatically serves up videocassette box art with drop shadows added by the software, at the resolution level the client requests. All of the usual picture by picture manipulation by a graphic artist is avoided. TrueSpectra's development team met Blockbuster's request for customization of images on the fly and now the automatic addition of drop shadows, text and borders are standard options with the image server software.

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Weaving your own Web site: Part 52

An in-depth look at Cascading Style Sheets: Part 10

By Keith Schengili-Roberts

Cascading Style Sheets (CSS) provide Web authors with much greater control over such things as setting colours, creating objects set to a specific size, and much more. By using CSS, it is possible to set exact sizes for such things as the padding value in borders and margins, and to set colours to HTML tags which ordinarily would not be capable of taking on a colour value. CSS also expands the ways in which colours and units of measurement can be specified in a Web page.

Using colour in CSS

If you've been following this series, you'll already have seen several examples of code that use colour values, primarily using the CSS property COLOR, as in the following simple example:

```
<B STYLE="COLOR: RED">Red, bold text</B><BR>
```

In this case, we are using a standard HTML colour RED, but there are several other ways to specify colour values.

Most Web authors are already familiar with how to specify colour values using a hexadecimal colour value, which in general enables the Web author to set a more precise shade of a colour onscreen than a typical colour name (such as red, green or blue) provides. Under the standard HTML method of setting hexadecimal colour values, there are in effect three pairs of numbers containing two digits apiece, with the first pair corresponding to the amount of red to be displayed, the second to the amount of green to be displayed, and the third setting the amount of blue to be displayed. Hexadecimal values run from 00 to FF (from 0 to 255 in regular numbers), where FF is the maximum possible value. Under this scheme, a hexadecimal colour value of FF0000 is equal to red, 00FF00 is equal to green, and 0000FF is equal to blue. This combination of values allows for more than 16 million colours, giving the Web author a very large palette to play with.

By now, you have probably guessed that you can use hexadecimal colour values in CSS as well, and you'd be right. CSS actually provides two different ways to set CSS values. In the "full" hexadecimal value version, you can set text to the colour red by using the following code:

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I can see clearly now

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The TrueSpectra image server allows retailers to bring their Web sites and product lines online in a fraction of the time and cost of traditional methods, and allows for rapid updating and redesigning.

Blockbuster Video (top) and Sears Canada (middle, bottom) are the catalogue Web sites that use TrueSpectra's image server.

By largely automating the process of creating flexible interactive and image-rich Web pages, TrueSpectra image server eliminates most of the time-consuming grunt work traditionally associated with preparing scanned high resolution images for the Web. Compared to using an image-editing package such as Adobe Photoshop, formatting images with the TrueSpectra server can be far more cost-effective. The result for online consumers and retailers alike is more informative product display and the easy access to higher resolution product illustrations for consumers.

Continued on page 112

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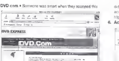
Some Restric

10 DVD-related Web sites

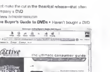
By Keith Schengili-Roberts

While they've been saying it for several years now, this past holiday season seems to have been the one in which DVD finally took off. If you were lucky enough to get a DVD player in your Christmas stocking, or buy one in the Boxing Day sales, chances are you are looking for good information on the latest DVD movies and DVD gear. The following Web sites are definitely worth checking out!

1. **Digital Bits** • This site has become a popular destination for many DVD owners, and with good reason. It's a good resource for the latest information on upcoming DVD releases, cancelled releases, plus regular reviews and daily columns on DVD-related news and rumours.
   http://www.thedigitalbits.com
2. **DVD FAQ** • This is the FAQ section for the popular rec.video.dvd Usenet forum, which incorporates all of the collected wisdom from posters to this newsgroup. This very extensive FAQ answers any and all questions you may have about DVD technology, including DVD players, DVD and computers, producing DVD discs, and much more.
   http://www.dvddemystified.com/dvdfaq.html
3. **Earl's Famous DVD Technology Exposition Web Page Extravaganza Supreme Deluxe** • This page is actually recommended by the DVD FAQ for those people who are looking for a less technical introduction to DVD. Earl does a good job humorously explaining all of the acronyms and features of DVD, making it less intimidating in the process. It's the sort of Web page that you could print out for your grandmother if she needed an explanation of DVD.
   http://lonestar.texas.net/~bdub/earl/dvd.htm
4. **DVD.com** • Someone was smart when they scooped this



domain name. The site is an offshoot of the DVD Express online store. In addition to the usual reviews, this site provides interesting articles about the latest DVD-related news, interviews with leading DVD producers, and words of wisdom from Doc DVD, who can lend you a hand if you are experiencing problems.
   http://www.dvd.com
5. **The DVD Movie Review** • As the URL suggests, this site is devoted wholly to reviews of the very latest DVD releases. The reviews are good and are more personable than you will find in most printed publications, though they tend not to deviate too much from the general critical consensus. It also rates the quality of the transfer of the film to DVD, and talks critically about the extras—such as bloopers or footage that did not make the cut in the theatrical release—that often accompany a DVD.
   http://www.dvdmoviereview.com
6. **Active Buyer's Guide to DVDs** • Haven't bought a DVD



player but you're keenly interested? Want to learn more about the basics? The site provides a guide for would-be purchasers, and even comes with an online questionnaire to help you decide which make and model you should look for based on the sort of features you want.
   http://www1.dvdplayers.activebuyersguide.com
7. **Perry's DVD Release List** • Run by Perry Denton, this page is a simple listing of the latest DVD movie releases from the major studios. It provides the title of the movie, the intended release date, information on the aspect ratio ➤

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of the movie, the type of Dolby encoding used, pricing (in U.S. dollars) and the type of extras that DVD users have come to expect. http://www.surroundlink.com/dvd/dvd1.htm

8. **DVD Net** • If you are looking for a slightly different perspective on DVD reviews, then this site from "down under" may be what you're looking for. It will also give you a perspective on how DVD releases may differ from those released in North America. http://www.dvd.net.au

9. **DiVerse DVD** • If you are looking for the cheapest pricing on the latest DVD titles, this Web site is worth a peek. It provides a simple search engine that lists the current pricing for DVD titles at more than a dozen online retailers. It also mentions any special offers, discounts or free shipping offers currently being offered. Unfortunately for would-be Canadian buyers, it only lists American retailers. http://www.atrill.com/index.shtml

10. **The DVD Resource Page** • This Web site is devoted to personal reviews of the latest DVD releases, discussion forums on the latest home theatre advances, and a good listing of other online DVD resources. http://www.dvdresource.com ❑

Weaving your own Web site Part 52
Continued from page 104

```
<B STYLE="COLOR: #FF0000">Red, bold
text</B><BR>
```

Note how you have to use a hash symbol (#) in front of the hexadecimal number—this is required in CSS.

You can also set a "compressed" version of the same code in CSS, where a single number takes the place of two, so you could write the above example like this:

```
<B STYLE="COLOR: #F00">Red, bold
text</B><BR>
```

In this case, the F stands for FF and each 0 stands for 00. Similarly if you used a 3, it would represent 33, and a 9 would represent the value 99. This latter scheme does not allow for the same flexibility as does the first, as it only allows the Web author to specify a much smaller sub-set of hexadecimal colour values, but it is a quick and easy way to write code. In some ways it may actually be a preferred method, since any combination of the hexadecimal numbers 00, 33, 66, 99, CC and FF (which would be represented as 0, 3, 6, 9, C and F under the compressed scheme) constitute what is known as the "safe palette," which is universally recognizable on all colour computer screens.

CSS also allows Web authors to specify colour using an RGB value using either three sets of numeric or percentage values. The numeric RGB (red green blue) method works the same way as setting hexadecimal colour values. Instead of using hexadecimal values, however, regular numeric values are used. So under this scheme, you could set our sample line of text to red by using the following code:

```
<B STYLE="COLOR: RGB(255,0,0)">Red, bold
text</B><BR>
```

In this case the number 255 is the maximum value available for a colour, which in this case is assigned to the R in RGB. When specifying colours this way, you must put the numeric values in brackets, preceded by RGB. Percentage values can also be used to set colour in the same way so that a value like 100% corresponds to 255 in numeric terms or FF in hexadecimal. So you could set text to red by using the following CSS code:

```
<B STYLE="COLOR: RGB(100% 0 0)">Red, bold
text</B><BR>
```

These last two approaches to setting colour values will be familiar to many graphic designers, as it is common way of specifying values in professional programs like Adobe Photoshop.

It is worth pointing out that these ways of setting colour are fully supported in the latest versions of Internet Explorer and Netscape Navigator.

Continued on page 113

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- ☐ Software developer
- ☐ Systems integration/software consulting
- ☐ Government purchasing agents
- ☐ Computer maintenance/service company
- ☐ Hardware/software retailer
- ☐ Other/please specify ______

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- ☐ Branch, store, district, regional managers
- ☐ Channel, retail, value added resellers and managers
- ☐ Purchasing and merchandising managers
- ☐ Product development managers
- ☐ Computer consultants
- ☐ Technical management
- ☐ Design, system and application engineers
- ☐ Marketing, sales managers
- ☐ Other/please specify ______

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- ☐ 1,000 - 1,999
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- ☐ Other/please specify ______

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Me, myself and my avatar

Continued from page 104

virtual worlds. But, at the time computers did not have the power or flexibility to do what he wanted.

Beyond chat

The virtual worlds that did exist were text based with people having to type in long, detailed descriptions of the world and their online personas. Damer says it wasn't until computers became more powerful and the Web became a household word that avatars and virtual worlds as envisioned by Stephenson could become something of a reality.

Today there are several online virtual worlds in which one can explore and interact in an avatar form.

One of the most popular is ActiveWorlds (http://www.activeworlds.com) a community based 3D environment in which people can build their own worlds or chat and interact with other community members in the various worlds that already exist. One of the largest in ActiveWorlds is AlphaWorld a city like landscape in which one can use an avatar to walk through parks streets or even into rooms and buildings and meet people.

Started in 1995, AlphaWorld has some 100 million "objects" (such as buildings, parks, trees, roads, homes and offices), and looks like a major metropolitan city. You download an ActiveWorlds browser, then for US$19.95 register as a citizen, taking on a name and avatar. You are then transported into AlphaWorld (or any other world in ActiveWorlds) where you can begin interacting with other avatars. After a while you are greeted by any number of people who approach you in the community. They may ask what you are doing, if you need help with anything or if you just want to chat about a favourite movie, book or CD. Spend enough time in the environment, and you will find yourself with avatar friends, making plans to to just hang out or organizing a party that could be joined by any number of other avatars.

What is surprising is how naturally the conversations and interactions flow between people using avatars, especially when compared to text-only chat conversations.

For Liss Jeffrey director of the byDesign E-Lab Una with The McLuhan Program at the University of Toronto, it is the "social space" that these virtual worlds and avatars provide that makes the online interactions easier and more natural than those found on current chat venues. Jeffrey's own work involves trying to create "public space" online for people to form communities in which they can work, meet and exchange information.

"If you look at chats, they are really ungrounded, superficial communications for the most part," Jeffrey adds. "ICQ may allow you to do a lot of things, but the actual chat is a lot of, 'Hi! How are you!' kinds of communications. It is so limited. When you look at an avatar-dominated environment, when you get the sense of the gestures, movement and the environment, it seems to add so much of what the text based communications can't. That is the real breakthrough."

Adds Patrick Kitano, "In the early days of the Internet revolution, chat with strangers was really a fad." The vice president of business development and sales for Blaxxun Interactive in San Francisco, says "once chat was considered the killer application. But chatting with strangers just does not cut it anymore."

Blaxxun, which designs virtual worlds like cybertown (http://cybertown.com), sees avatars as the real Internet revolution, allowing people to come together and create whole communities around common interests. These could include political discussion groups right up to communities based on popular television programs. Already Blaxxun (which takes its name from the Metaverse bar Black Sun, in *Snow Crash*) is working with a major television network to create a virtual avatar community around some of its most popular shows.

"What we are hoping to do is create a parallel world online for the show," Kitano says. "People who are fans can come on with their avatars and talk about the show, or even role play [in this world] where they can represent themselves as avatars from the show."

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Me myself and my avatar

Continued from page 109

But for those working with avatars and virtual worlds, the possibilities of the technology go beyond merely creating interesting places for people to chat about the "cyber" weather or debate about whether Mulder and Scully should kiss.

Putting your best business face forward

Bruce Damer's Digital Space is looking at creating virtual worlds and environments in which people can do business, allowing participants from around the world to collaborate on projects

One company Damer is working with is a genetic research firm Digital Space wants to create a virtual community for the firm, giving each member of the far flung research team an avatar so they can meet, exchange ideas, findings and data, and quickly create collaborative teams One can imagine a virtual conference room in which avatar team members could meet, exchange notes and even leave messages on a virtual white board for those who could not make the meeting—a giant step forward from online collaborative software available today

I think in 10 years [avatars] will be the primary interface for people in their daily lives and work," Damer says. "The Net, as it stands now is a half developed space The Web is not cyberspace The Web is a document database It is not interactive and is a fairly static medium. The avatar virtual world... really does embody the idea of you going somewhere and there are people there"

Classrooms without walls

The virtual University of Santa Cruz incorporates photos of the real campus.

One of the areas in which this sense of being in a real place among real people could be of the greatest benefit is in education

Bonnie Devarco, principal for the online learning environment for the University of Santa Cruz Calif has been looking for some time at using avatars and virtual worlds to create virtual classrooms and high schools for students

With a virtual high school students would take on avatar forms and attend class as they would in the real world A teacher would conduct a class, take questions and even make available additional information that students can access at a later time

"A teacher can populate a room with a lot of content and links and information like video streaming where the students can review the information and ask questions about it" Devarco says "Afterwards, the kids can use these 3D worlds to conduct peer to peer learning and collaboration."

As a demonstration of the power such online avatar based learning can provide, Damer helped organize a virtual recreation of the 1969 Apollo IX mission to the Moon It was hosted by Russell "Rusty" Schweickart, the pilot for the original mission

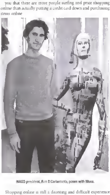
"For two hours Rusty floated around the [virtual] command service module and described what was going on in the mission," Damer says "A few things emerged that happened [on that mission] that no one had ever heard before, of going into orbit and preparing to go to the Moon Rusty allowed a new generation in cyberspace to feel somewhat what it was like to be in space, especially in the early '60s"

Later those attending the demonstration could take a walk on the Moon—in avatar form—recreating Neil Armstrong's climb down the ladder of the Lunar Lander and his stroll on the Moon's surface

Bargains down aisle omega

Another area in which avatars are already making an appearance is e-commerce. While there is a lot of hype about the online shopping revolution changing business, many will tell you that there are more people surfing and price shopping online than actually putting a credit card down and purchasing items online

> When you look at an avatar-dominated environment, when you get the sense of the gestures, movement and the environment, it seems to add so much of what the text-based communications can't
>
> *—Liss Jeffrey, byDesign E-Lab Unit*



iNAGO president, Ron DiCarlantonio, poses with Mona.

Shopping online is still a daunting and difficult experience for many Being confronted with a form screen filled with a variety of fields that need to be filled in, buttons clicked, and another set of instructions for following up and tracking an order can put off even the most cyber savvy consumer

To remedy this, Toronto-based iNAGO Inc has created Mona, a NetPeople avatar Mona's jobs include helping visitors navigate a Web site, offering helpful hints and answering their questions. Tied to a company's database, Mona will "watch" what a Web surfer is doing and will try to help whenever she can She responds to questions that are typed in or even spoken if the user's computer has voice recognition software

> What is important about avatars is that they allow people to have a "relationship" with technology

"It [Mona] tries to understand what you have asked match it with things that she knows and tries to answer your questions," says Ron DiCarlantonio, president of iNAGO "The response can be changing the page, speaking, moving, or a combination of the above She also gets feedback from your own actions and that is why it can grow as a living form."

DiCarlantonio also sees Mona being used by companies to help employees find information on an internal corporate network. For example, an employee looking for specific information on the company's health plan, pension options or complaints procedure can ask the avatar They can also request that the information be presented in a form that is useful to them.

There may also come a day where people will have their own avatar agents who will look for information on a new car home, or vacation for example and have it ready when they come home or have it sent to the office

DiCarlantonio suggests that what is important about avatars is that they allow people to have a "relationship" with technology It is easier to work with something if it has a human interface and can speak to you in your language, rather than having to learn its language of line commands key combinations and mouse-clicks.

DiCarlantonio first encountered digital relationships when he worked in Japan and helped develop digital pets—fish, birds or other animals that reside on a PC Like real pets, they interact with humans and require care and feeding to prevent them from dying. Surprisingly, these virtual pets caught on in Japan and the U.S proving that making the interaction with technology more "human" eases anxiety about using technology

Who will I be today?

There is a growing demand that avatars become more human too, reflecting the individual tastes and quirks of the people using them.

Avatars Sunrise and George the Bunny are creations of Millennium Interactive Company

Victoria D'Onofrio, president of Millennium Interactive Company (MIC) in Dallas, Tex. has been designing custom avatars for businesses and individuals D'Onofrio says people are looking for avatars that while not looking exactly like them will at least look good to others and reflect something of their personality

Creda Interactive's Peep won the Avvy99 grand prize

Continued on page 112

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The Legend continues The Legend continues The Legend continues The Legend continues The Legend continues The Legend continues

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Me, myself and my avatar

Continued from page 110

D'Onofrio says currently there are a lot of generic avatars that are quite boring and uninspiring. "What you should have as an avatar is something that expresses something about your inner personality," she continues.

D'Onofrio's work certainly has personality. Her "Eve before the fall"-inspired avatar won the 1998 Avvy Award. Last year, she was asked to be a judge at the 1999 competition held during the Avatars Conference.

Vancouver based Credo Interactive Inc. also believes that most avatars available today are not all they could be. To help correct this, Credo created Active Avatars for people who want a unique avatar—even if it is readymade.

Active Avatars is a collection of 12 different avatars ranging from the ever popular bug design to fantasy figures that include a variety of gestures and movements. Credo will design other avatars and make them available throughout the year.

"The interesting question that is posed in this area is: do people want to represent themselves as they are, or would they rather enter the world of fantasy and represent themselves as they'd like to be, represent something of their personality or just disguise themselves?" asks Garry Shilling, Credo's sales and marketing director. "The idea of having something to represent yourself appeals to human nature."

Credo's Active Avatars include humans and bugs.

Avatars and virtual worlds allow individuals to create environments in which they can represent themselves in whatever way they want—which will be the biggest appeal for many.

They allow you to create a world or meet people who want to do nothing more than talk about *The X Files* or the latest CD by a favourite musician. You could finally don that cape and mask and become the superhero you always imagined yourself to be; or just put on a nice suit and meet some friends for drinks in an online café.

"Avatars and virtual worlds are worlds unto themselves," Shilling adds. "I'd parallel it to any kind of cultural offshoot that has its own language and code. The whole jazz culture has its own language and way of doing things and the hip hop youth culture has its own way of speaking. I think that [Marshall] McLuhan's idea of the global village applies here. People from all walks of life and different places become something else when they come to these worlds. I think of it as an extension of [William] Shakespeare's [soliloquy] 'All the World's a Stage'—where we can become something else." ❑

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Be and Opera team to enable Net appliances

Be Inc. (http://www.be.com) and Opera Software (http://www.opera.com) have announced a development and marketing agreement to deliver Web browsing technology for Be's software platforms. Under the agreement, Be and Opera Software will deliver a version of Opera's Web browser, which Be will offer as part of both its internet appliance software platform, code-named Stinger, and its desktop operating system, BeOS. The parties expect to deliver the first software under the agreement in the first quarter of this year.

The Opera browser has already received worldwide acclaim for its efficiency, robust feature set and compatibility with leading Web standards, including HTML 3.2, JavaScript, SSL (Secure Sockets Layer) 2.0 and 3.0, and CSS (Cascading Style Sheets), allowing most online content available today to be viewed easily while enabling secure transactions for e-commerce.

Under the terms of the agreement, Be will bundle the Opera browser with BeOS and the browser will serve as the user interface for the Stinger platform, making it possible for Stinger licencees to create customized interfaces for Internet appliances. Additionally, licencees will be able to leverage existing Web content, providing access through the Opera browser. Stinger with the Opera browser will enable a far more personalized interface and user experience than is currently possible using PC-based browsers.

"Opera Software is widely known for building one of the world's best browsers," said Steve Sakoman, chief technical officer of Be and general manager of Be's Internet appliance efforts. "The Opera browser is fast, flexible and supports virtually every major Web standard in use today. Not only will the Opera browser complement our desktop software, it is poised to offer the best browsing experience available for Internet appliances."

"With its high performance and low resource requirements, Be is the ideal operating system for our browser," said Jon Stephenson von Tetzchner, co-founder and chief executive officer of Opera Software. "Together with our browser, Be's outstanding media capabilities will enable the next generation of Internet appliances: fast, simple to use and with a richer, more satisfying Web experience than is possible today."

Stinger is the code name for Be's compelling software solution designed for the creation of appliances that deliver information and entertainment over the Web. Based on BeOS, Stinger is fully customizable and supports popular streaming audio and video standards.

—*Newsbytes*

I can see clearly now

Continued from page 105

According to TrueSpectra chief executive officer and president Sasa Radulovic, "Our core platform and extensions change the way images are published and viewed on the Web, making the development process faster and easier, and enabling interactivity for customers. Retailers can provide a customized shopping experience by offering user choices such as mixing and matching different product combinations."

TrueSpectra has been nominated for two prestigious SIIA Codie Awards, in the E-Commerce Best Product, and E-Commerce StoreFront Best Debut categories.

TrueSpectra began in 1992 as a research project by students at the University of Waterloo. With the help of venture capital from the Royal Bank and other investors, the company released the first commercial version of its image server in April 1999. Response from e-commerce companies and commercial Web site consultants and developers has been enthusiastic, and TrueSpectra appears poised for widespread acceptance as a preferred supplier of a key graphics technology to the e-commerce industry.

TrueSpectra anticipates rapid growth in sales in 2000 and beyond, mostly to e-commerce solution providers who will integrate the image server into their clients' sites. The company is raising additional venture capital to fund its future development, and may go public with a stock issue sometime in the next year. ❑

Weaving your own Web site Part 52

Continued from page 108

Units of measure

One of the chief benefits of CSS to Web authors is the fact that you can finally specify many standard units of measure to such things as borders, font sizes, margins and many other CSS properties. There are eight units of measure that can be used with CSS properties: inches, millimeters, centimeters, picas, points, pixels, m lengths and x heights. All of these units of measure can be specified in CSS code by specifying the following:

- inches = IN
- millimeters = MM
- centimeters = CM
- pica = PC
- point = PT
- pixels = PX
- m-length = EM
- x height = EX

Units of measure are not case-sensitive, so you could use either IN or in to set a measure for a given CSS rule when setting a property using inches.

Inches are a standard measure of length in the imperial system of measurement, and are in regular use in the U.S. There are 25.4 millimeters to 1 inch. Similarly, millimeters and centimeters are standard units of length under the metric system. There are 10 millimeters to 1 centimeter and 2.54 centimeters to 1 inch. Picas and points are standard typographical units of measure. There are 72 points to 1 inch, 12 points to 1 pica and 6 picas to 1 inch. In Web browsers, the typical default value for text display is 12 points for variable-width fonts (typically Times Roman) and 10 points for fixed width fonts (typically Courier). Pixels are a standard unit of measure for measuring height and width on computer screens. Depending on the type of computer monitor being used and the resolution being displayed, a typical pixel measures between 0.25 and 0.35 millimeters. The m length and x height refer to the length and height, respectively, of the letters "m" and "x" in a given font. In a fixed-width font such as Courier, the "m" and "x" lengths should be the same.

```
<HTML>
<BODY STYLE="FONT FAMILY MONOSPACE">
<P STYLE="MARGIN LEFT 0IN">
This paragraph has no left margin. All of the other para-
graphs that follow have margins that should be set the
equivalent of one inch.
</P>
<P STYLE="MARGIN LEFT 1IN">
This paragraph has a left margin set to 1 inch.
</P>
<P STYLE="MARGIN LEFT 25.4MM">
This paragraph has a left margin set to 25.4 millime-
ters
</P>
<P STYLE="MARGIN LEFT 2.54CM">
This paragraph has a left margin set to 2.54 centime-
ters
</P>
<P STYLE="MARGIN-LEFT 6PC">
This paragraph has a left margin set to 6 picas
</P>
<P STYLE="MARGIN-LEFT 72PT">
This paragraph has a left margin set to 72 points
</P>
<P STYLE="MARGIN-LEFT 96PX">
This paragraph has a left margin set to 96 pixels.
</P>
<P STYLE="MARGIN LEFT 12EX">
This paragraph has a left margin set to 12 ex
</P>
<P STYLE="MARGIN LEFT 6EM">
This paragraph has a left margin set to 6 em
</P>
</BODY>
</HTML>
```

If you try this code out in a browser, only the last two paragraphs fail the test. This is because both Internet Explorer and Netscape Navigator use the rough calculation that 1 EX equals 1/2 EM, which is not correct for all fonts. However, it is worth pointing out that both browsers display the same results (even if they are not, strictly speaking, correct). There is also a chance that the paragraph set to a pixel value may not be indented by 1 inch onscreen. This would be due to the different resolution of the computer screen you are using. The higher the resolution, the more pixels there are per screen inch. It is worth keeping this in mind whenever using pixels as a unit of measure. ❑

Next time: Pseudo-classes and pseudo elements. Keith Schengili-Roberts welcomes any comments, suggestions or HTML tips you may have. You can email Keith at: robertsk@wave.home.com. Look for his upcoming book on CSS, *Core CSS*, to be published by Prentice Hall (ISBN 0-13-083456-4). Previous articles in the series can be found at: http://www.tcp.ca/Weaving/Weaving.html

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First steps with Access

The first time you open Access and use it to create a small database, you'll probably think you're using a very big hammer to crack a very small nut. And you'll probably be right. Access is a powerful and complex database program and using it to manage a simple database is slight overkill. However there's no better way to learn about Access than by actually using it.

This month, in response to reader requests, we'll look at how you can use Access to create and manage a small database. The data we'll record will be details of employees in a small business:

Employee number	First name	Last name	Date employed	Department	Car park	Salary
105	Jane	Smith	12/8/90	Accounts	Yes	38000
156	Susan	Smithson	2/24/92	Accounts	No	36000
153	James	Matthews	3/3/95	Sales	Yes	58000
158	Mary	Liu	1/5/97	Sales	Yes	56000
151	Wayne	Long	8/17/96	Service	Yes	40000
152	Kelly	Adams	7/21/94	Service	No	37000

Once the data is entered into the database, you can use Access's tools to locate information and create reports to display the data. The instructions that follow use Access 97 but they'll work fine in Access 2000, too.

Before you press the On switch

Before you turn on your computer you should design your new database on paper. Do this by looking at what you want the database to do. In our case the manager wants to be able to find quick answers to questions such as Who has car park spaces? Who works in the Accounts department? and If I give everyone a 10 percent salary rise this year, what will this cost me?

In our case the manager already knows what information he needs to store in the database because he's been using a card system for some time. If he didn't have this experience he'd have to consider all the possible questions he'd need answers to and the type of reports he'd need to produce. It's not until you know what you need to get out of a database that you can determine what you must put into it!

When you know what data you need to put into the database you can determine how you'll organize it. It's easier to manage people's names if you split these into first name and last name. This way you can search for a person by last name and create lists in alphabetical order. You can also use the mail merge option to send letters that read "Dear Mary," etc. If you don't split names into first name and last name then these tasks will be more difficult to complete. You should also split address information into street name and number, town, state/province, country and zip code/postal code.

Each individual piece of data—last name, postal code, or department for example—becomes one field in your database table. Give each field a name and determine the type of data you're storing in each field. Is it text, a date, number Boolean (yes/no), etc.

You'll also need a Primary Key, which is a field (or combination of fields) unique to each record. In this case, every employee has a unique employee number so this will be the Primary Key field.

If you were to create a database containing more than one table of data you'd also need to determine how your tables relate to each other and how they will be linked. In our scenario there's only one table, allowing us to bypass this step.

At the end of the planning stage you should have a list of field names and data types like this.

Field name	Type
Employee number	number
First name	text
Last name	text
Date Employee	date
Department	text
Car park	yes/no
Salary	number

Setting the database up in Access

Now that you've planned your database, create it by opening Access and choosing Blank Database from the dialogue that appears, and click OK. Give your database a name (Employees) and select a folder to store it in.

Continued on page 118

Two books for Java on the server

By Jacques Surveyer

Java has a large and rapidly growing presence in Web server applications. It is the number one language for Web programming on the server and, with new bandwidth coming from cable, wireless and DSL, it will soon be the major player on client side, be that on PCs, PDAs or other handheld devices. Java's superior security model, uniform cross-platform portability, and constantly improving performance mean it will be the pre-eminent programming language of the next decade. These two books cover the most important of those technologies with lots of examples of how to create Java servlets and server-side applications.

Professional Java Server Programming
Authors: Danny Ayers, et al
Publisher: Wrox Press
http://www.wrox.com
ISBN 1-861002 77 7
Softcover 1 120 pages 1999
Extras: Source code available at Wrox Web site

Price: $90
Format/layout: Wrox Press normally sets the standard for book features, but for a topic with so many sub topics and code, its $90 price should include a CD ROM of source listings and content codes.
Rating 3.5 out of 5
Contents and coverage: Covers all the major topics but in a melange of writing styles and illustrations. This title includes the hot Java server-side topics: Java Servlets, Java Server Pages, XML, Enterprise JavaBeans, CORBA, JDBC and other transaction services. Rating 4.2 out of 5

Java and CORBA
Authors: Robert Orfali and Dan Harkey
Publishers: John Wiley & Sons
ISBN 0-471 24578 X
Softcover 1,020 pages 1998
Extras: CD-ROM with source code and trial software
Price $70.50

Format/layout: Books by Orfali and Harkey also get top marks for the format and layout. Rating 4.8 out of 5.
Contents and coverage: The most thorough analysis of not just Java and CORBA, but of all the other competing tier development strategies. Includes quick, gut feel benchmark code but lacks important XML and messaging coverage (which is included in a separate book). Rating 4.5 out of 5.

Continued on page 119

Linux for Newbies: Part 7

Linux editors: The joy of text

As you've undoubtedly noticed by now, Linux thrives on text files. From configuration files to Web pages to program source code, text is king. You absolutely have to learn to use a Unix text editor to get anywhere with this OS.

By Gene Wilburn

The joy of text files is that they're portable, viewable, searchable and can be easily modified. They can also be "commented" allowing you to document your scripts and configuration files in ways that will mean something when you revisit them in six months. Text is the Unix Way. No troublesome Microsoft registry files here. Just pure text. Revel in it.

To assist you in your reveling are a broad spectrum of text viewers and editors. Viewers (also known as pagers) provide you with a safe way to examine files. You can't edit with them so you can't do any inadvertent harm such as accidentally inserting a character or two. I recommend that you start with these. The classic text viewer is More. To view a file with More, you simply type `more myfile.txt`. Some examples.

```
# more /etc/file.conf
# more /etc/inetd.conf
# more /etc/rc.d/rc.local
```

You will find a version of More on every Unix system. An enhanced variant of More is the GNU Less program. This is a typical Unix naming joke because Less is more than More, more or less.

Both programs display a screen full of text at a time allowing you to scroll forward and backward. You advance a page forward by pressing the spacebar or by typing f for forward. Typing b will scroll back a page at a time. You can search the contents of a file by pressing a forward slash (/) and entering a search pattern. Both programs will load several files at once if you use a wildcard, `more /etc/*.conf`, for example. To get to the next file, press a colon (:) followed by n for next. Type q to quit either program. To find out more about More or Less, type `man more` and `man less`.

If you were ever a DOS user you may remember Norton Commander. It was a ver-

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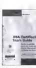

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Linux editors: The joy of text

Continued from page 114

satile, elegant character menu combo tool that could be used for browsing, editing, renaming and moving files. If you liked Norton Commander, you'll be right at home with a nifty open-source clone called Midnight Commander. It's on most Linux distributions as mc. Go to a command line prompt and try it out. You get a split screen with panels left and right that you can control independently. The function keys provide easy access to the view, edit and other functions. Midnight Commander even allows you to inspect the innards of RPM files. The program makes an excellent viewer and simple editor.

Simple text editors

Unix has a reputation for hard-to-learn text editors (we'll visit those in a minute) but there are a number of easy editors you can use. The text editor within Midnight Commander, for example, is very DOS-like in its operation and it can be invoked independently. You can call it directly from the command line, e.g.

```
# mcedit /etc/lilo.conf
```

Many a Linux newbie has been thankful to find this editor on the system. Another option: did you ever use Wordstar or a Wordstar-derived editor, such as those integrated into Turbo C and Turbo Pascal? Meet Joe (Joe's Own Editor). You might have to install this from your /RedHat/RPMS CD-ROM directory since it is rarely installed by default. As with the original W[illegible] has an option for displaying help [illegible] while you're editing. To install and use Joe type the following after you've inserted your Red Hat CD-ROM (note: this series of tutorials is based on Red Hat Linux 6.0).

```
# mount /dev/cdrom /mnt/cdrom
# cd /mnt/cdrom/RedHat/RPMS
# rpm -Uhv joe*rpm
# cd /
# umount /mnt/cdrom
# joe /etc/lilo.conf
```

Then type `Ctrl K H` to display the help menu.

Another pleasant, easy to use editor is Pico, which comes with the text based mail reader Pine. Most Linux systems have Pine installed so Pico is available for your use. As with Joe, it presents help menus, making it very easy to learn. The only thing to watch with Pico is that, by default, it wraps lines of text. This is a good thing in email but it's a bad thing in configuration files. Hence you should invoke Pico with the -w flag to prevent line wrap, e.g.

```
# pico -w /etc/lilo.conf
```

Black belt editors

Because Linux is based on text files, Unix editors and utilities have been designed to manipulate text in uncommonly powerful ways. Hence it is worth your while, if you want to move beyond a beginner's level, to start working with these tools. You will want to learn how to use grep and its variants (type in man grep) and at least one of the classic [illegible] Vi or Emacs. Of the two, I'll [illegible] Vi as your first conquest. Vi (pr[illegible]) the most widely available editor [illegible] will find a version of it on every [illegible] system you encounter, from Linux to Solaris to FreeBSD.

The Vi editor, originally created by Bill Joy at the University of California at Berkeley, has more of the lean, classic Unix feel than Emacs. When you start up Vi it's fast and light. But learning it takes a fair bit of patience. What makes Vi confusing is that it's modal: it has a command mode and an edit mode. You "shift gears" by tapping the ESC key.

Here's a very brief demo on how to use Vi. The boldface items are the commands you type. Try this on a practice file.

```
# vi mytext.txt
i
Line one
Line two

Skipped a line

Skipped another

Last line
[ESC Key]
:x[ENTER Key]
```

You've just created your first file with Vi. The i is the insert command and the ESC :x combination takes you out of edit mode, and into command line prompting, allowing you to type the save and exit command x.

There are many Vi tutorials on the Net where you can go to learn more commands. Vi is also covered in most books on Unix and Linux. The Vi command set is very rich and a modern Vi such as Vim offers macro record and playback, color syntax highlighting and split screen display. Vim is the default Vi for Red Hat Linux.

There's a new Linux Vim-HowTo with a Vi tutorial at http://www.linuxdoc.org/HOWTO/Vim-HOWTO.html, and you can locate other online tutorials by typing "vi tutorial" in your favourite search engine.

Despite the oddball keystrokes, once you develop a comfort level with Vi you'll discover it is quite efficient. You never have to take your hands out of typing position. And Vi is a life skill—you can take Vi anywhere. You can even baffle your Windows friends by installing the Windows version of Vim on your other hard drive partition and enjoy watching their faces while you edit a file. This also gives you a chance to practice Vi while you're in a Windows session.

Emacs, in contrast, is a very large Swiss Army knife like program—a powerful editor that can also be used to read email, newsgroups, and even surf the Web. It was written by Richard M. Stallman, the person who started the Free Software Foundation (GNU Project) to which Linux owes much of its existence.

Emacs is powerful because it was designed to be extensible through a built in programming language—LISP. The "macs" in Emacs stands for macros.

Continued on page 119

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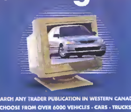

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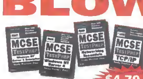

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First steps with Access

Continued from page 114

You'll see an empty Database dialogue appear on the screen and you're ready to begin

Create your table using the Table Wizard, which will automate much of the process. To begin select the Table tab, click New, choose Table Wizard and click OK. You'll see a list of sample tables and the fields you'll typically include in them. Click the Business option and from the first window choose the Employees sample table. Choose these fields (in order) from the Sample fields list and click the right pointing arrow to add them to the list on the right (Fields in my new table), EmployeeNumber, FirstName, LastName, DateHired, DepartmentName and Salary. You'll note there's no field for Car Park details so you'll need to add it manually later. For now, choose Next.

The next dialogue offers to name your table Employees which is acceptable. Choose No, I'll Set The Primary Key and click Next. From the What Field Will Hold Data That Is Unique For Each Record dropdown list choose EmployeeNumber and choose the Numbers I Enter When I Add New Records. This means the EmployeeNumber field will contain numbers only, which you will enter rather than having Access provide them. Click Next to continue and at this final screen choose Modify The Table Design option (so you can add the CarPark field) and click Finish.

You'll see your table on the screen in Table Design View, which shows how your table is designed rather than what it contains. You'll see the six fields you've added and their Data types are listed—these correspond pretty much to the types in the list above. To add the field for the Carpark data (in its correct position), click in the margin to the left of Salary so you highlight that row and choose Insert, Rows. In the Field Name cell type CarPark and from the dropdown list in the Data Type cell choose Yes/No

Adding the data

You're now ready to add the data to your table. To do this, switch to the Datasheet view by choosing View, Datasheet View. You'll be prompted to save the table, so answer Yes when asked. You can now enter the data—one item per cell—for your table. Use the Tab, Enter or Right Arrow key to move to the next field in the row type your dates in the format 8 12 99 (using dashes) and, to enter the data in the Yes/No field, press the Spacebar for Yes and leave the checkbox unchecked for No.

When you've entered the data you can close the table by clicking the Close button in its top right corner. You'll be returned to the Database dialogue and you'll see that the Tables tab contains your new Employees table

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Two books for Java on the server

Continued from page 114

Professional Java concentrates on the use of servlets in conjunction with browsers database servers and all the top Web servers including Apache, Microsoft IIS and Netscape For example one of the sample programs shows how to duplicate every CGI-environment variable and major method with its Java Servlet equivalent—but running 10 times faster Following that are exercises in using Java Server Pages and XML to create links to many types of database and systems files and data.

In contrast, *Java and CORBA* spends more time on the use of CORBA and comparing it to all the alternative Java technologies CGI Servlets RMI Enterprise JavaBeans Microsoft DCOM and C++ with sockets The treatment is thorough and packed with examples of code that includes benchmark tests (with the required ORB support software and source code on the included CD ROM) This benchmark code is invaluable because it allows readers to see the trade-offs, not just in runtime performance but also in ease of development *Also Java and CORBA* does a much better job of explaining the transition from client server to n-tier processing with its varying strategies and advantages

Programming Java has 16 appendices dealing with the Java 2 Enterprise APIs so the new classes and methods beyond JDK 1 1 7 are spelled out in detail However Java is moving very quickly, so in both books there are some gaps—Java Server Pages 1 0 is discussed but not the recent 1 1 only part of Enterprise JavaBeans 1 1 is dealt with and there is no coverage of Java Transaction Processing or J Messaging Services. The latter will be important to those interested in asynchronous processing with middleware like IBM's MQSeries or Hewlett Packard's e-Speak.

In general, the state-of-the-art in Java software agents like JINI and other APIs are only covered peripherally Nonetheless, the coverage of the core Web serving and servlet technology is treated comprehensively It s hard to keep up with the Web development trends without key books like these that show Java Server technology in action ❑

Linux editors: The joy of text

Continued from page 116

As with Vi, Emacs can be used at the command line, but it's a much nicer editor when you invoke it under X. In the X environment, Emacs sprouts menus and mouse support, taking the sting out of learning its complex keystrokes.

Emacs is my editor of choice for programming, writing and designing Web pages. With features such as auto-indent, colour syntax highlighting, compile options, bracket matching, HTML syntax verification, spell checking, multiple file buffering unlimited un dos, split-screen editing, and revision control built into the editor, it provides me with all my serious editing needs

I typically use Vi to edit small files such as configuration files, and Emacs for larger files such as articles, programs and Web pages

If you find yourself struggling with Vi and Emacs and decide that neither of them is for you, there's a newer editor available that offers a more Windows like feel. It s called Nedit and you can obtain it from the Red Hat ftp site (ftp.redhat.com) in the /pub/contrib/libc6/i386 directory as nedit 5.02-2 i386.rpm Also pick up all the lesstif-current" files and install them first. When you're logged in as root, go to the directory where you saved the files and type

```
# rpm -Uhv lesstif*
# rpm  Uhv nedit
```

Then log in as yourself. You can type nedit & while you're in X and enjoy using Nedit.

There are many more editors available for Linux than the ones I've touched on here and in the course of your travels you may find one you like even better. Vi and Emacs are the classics Learning them requires discipline and determination. Most of the advanced admin features of Linux also require discipline and determination, so learning these editors is a good practice for your continued development as a mid to advanced level Linux techie. ❑

Next time: PPP connect to the Internet

Gene Wilburn (gwilburn@hemo.com) is a Toronto-based IT manager, musician and writer who operates a small farm of Linux servers Earlier tutorials in this series are available at http://www.northernjourney.com

First steps with Access

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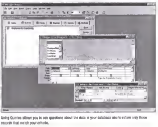
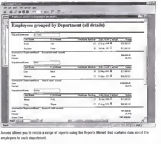
You can open the table at anytime by selecting it and click Open (Datasheet view) or click Design to open it in Design view. For now open it in Datasheet view and see how you can alter the ordering of your data using the Sort Ascending butt[illegible] it) and watch as th[illegible] in LastName order [illegible] for any field in the data table.

You can use the Find [illegible] to find records in the data table. To find the people with the last name Smith, select the LastName column



Using Queries allows you to ask questions about the data in your database also to return only those records that match your criteria.

buttons on the toolbar. To do that, choose the column containing the Last Name by clicking the column heading to select it. Click the Sort and click the Find button (it has a pair of binoculars on it). In the Find text area, type Smith and from the Match dropdown list choose Whole field and click Find First and you'll be taken to Jane Smith's record. Click Find Next and note that there is not another matching record. However, the situation will be different if, from the Match dropdown list, you choose Any Part of Field or Start of Field—in this case you'll "find" the records for Jane Smith and for Susan Smithson.



Employees grouped by Department (all details)

Access allows you to create a range of reports using the Reports Wizard that contains data about the employees in each department.

Finally, you can filter your data to display a subset of it using the Filter buttons. To see how this works, move to the DepartmentName field and select the word Sales from one of the records. Now click the Filter By Selection button and you'll see only those records for people who work in the Sales department. To return to viewing all the data in the table choose the Remove Filter button. Of course, you're only working with a small amount of data but you

Continued on page 122

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    By Harley Hahn McGraw-Hill Ryerson ISBN 0072121947 $55 95
8. **Canadian Internet Directory And Research Guide 2000**
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1. **Internet Rough Guide 2000**
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First steps with Access

Continued from page 120

will find that these tools are handy when you're working with a large data file

Querying your data

Using queries you can ask questions about the data in your database and store these queries so you can reuse them later To create a simple query for this table, close the table if it is open (you can answer No or Yes when you're prompted to save changes to the table design) and choose the Queries tab Click New, choose the Simple Query Wizard and click OK

The first query you'll create will display a subset of the data in the table the first name last name, salary and department To do this, select the fields FirstName, LastName, Department and Salary from the left window, click the arrow key to move them to the right window and click Next From the next screen choose Detail (shows every field of every record) and click Next Name the query "Employees by Department" and choose the Open The Query To View Information button and click Finish You'll see a subset of the data from your table on the screen.

Modify this so you can type the name of the department and see details of only those employees who work in that department To do this, choose View, Design View to move to the area where you can alter the design of your query In the column headed DepartmentName in the Criteria row type [Type the Department Name] The square brackets are important as they tell Access to ask you for the department name before the query results are displayed

To see how this works, click the Run button (it has a red exclamation mark on it) and a dialogue will appear prompting you to enter the department name Type Sales and click OK. Now, the query will display information for only those employees who work in the Sales department. Close this query by clicking the Close button in the top right corner

Displaying your data on paper

Reports are a way of committing the data in your table to paper You can set them to contain all the data or simply a subset of it To create a report listing the employees grouped into departments begin by choosing the Reports tab, choose New Reports Wizard from the dropdown list choose Employees (so the data for the report will come from the table) and click OK Choose all the fields so they'll all appear on your report

In the next dialogue you'll choose the field that the data will be grouped by Select the DepartmentName field and click the right pointing arrow to move it to the window on the right. Click Next and choose the fields LastName and FirstName as the sort fields—so the employees will appear in alphabetical order within the department groups Choose the Summary Options button and from the Salary row enable the Sum checkbox choose the Detail and Summary option button and enable the Calculate Percent Of Total For Sums checkbox and click OK then Next.

From the layout options choose Align Left 1 Landscape and enable the Adjust The Field Width So All Fields Fit On A Page checkbox and click Next Choose one of the styles click Next give the report the name "Employees grouped by Department (all details)" choose the Preview The Report option and click Finish Wait while the report is compiled and the results displayed. You can print this report or merely view it on the screen Like the Query its design is saved so you can create a report using these settings anytime by simply double clicking the report name in the Reports tab

So there's the Access 101 quick tour Of course there's a lot more to it but you're off to a good start In future columns we'll take a look at some more advanced features ❑

Helen Bradley specializes in writing hands-on tutorials Her columns appear regularly in a number of publications in the U.S. Australia the U.K. as well as *The Computer Paper*
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MP3 and camera for your wrist

LAS VEGAS—Casio Inc (http://www.casio.com) has unveiled the Wrist Audio Player billed as the world's first wrist type wearable MP3 player. The player which also serves as a watch with timer and alarm features comes with stereo earphones. The device is a little over 5 cm (2 in.) square and 1.27 cm (0.5 in.) thick, weighs 70 g (2.45 oz.) and is is water-resistant. It can store approximately 33 minutes of CD-quality MP3 data and features a four-hour battery life and animated graphics characters that move in time with the music.

Casio also unveiled a digital camera that can be worn on your wrist. The WQV-1 Wrist Camera can store up 100 images on its 1 MB of built in memory and includes a 120-x 120 pixel LCD viewer to use when shooting or reviewing the monochrome images. —Newsbytes

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Beginning Java: an excellent primer

Java is different than C or C++. The proof is in the higher productivity with Java reported by traditional C/C++ shops that switch to Java. I have yet to encounter a story saying C++ programming was more efficent.

Beginning Java 2
Author: Ivor Horton
Wrox Press
http://www.wrox.com
ISBN: 1-861002-23-8
Softcover 1 110 pages 1999
Extras: Source code blocks
Price: $75
Format/Layout: Wrox Press sets a high standard for books, with features such as a concise table of contents, thorough index readable tables and source code blocks. The author carries it one step further with good diagrams and ample screen shots but the $75 price is steep. Rating: 3.8 out of 5
Contents and Coverage: Many authors make the mistake of teaching Java as an extension of C or C++. The syntax is familiar but what Horton clearly conveys is that Java is a novel implementation of object oriented languages that forgoes pointers operator overloading and multiple inheritance for clarity and simplicity of expression. Rating: 4.5 out of 5

The reasons for this are straightforward. First Java APIs are comprehensive and standardized, while C++ APIs are comprehensive but far from standardized with at least a dozen different GUI APIs for example. Second because of the simplified memory pointer and inheritance models the sandbox security better thread and exception handling syntax, plus automatic integrity checks, Java programs start from a cleaner and more bug-free base. Finally Java gives developers so many more deployment options: compiled executables browser applets Web servlets, JavaBeans and Java ServerPages (JSP), for example.

However these advantages have to be weighed against Java's rapid rate of change. Programmers have been asked to adapt to and keep pace with a new GUI APIs have moved from AWT to Swing classes, and hundreds if not thousands of new methods and classes have been rolled out. Fortunately Horton's book brings not only the latest, state-of-the-art Java coding APIs but also an object orientation right from the start.

Thus Horton spends extra time explaining the reasons and workings behind the simplified memory model automatic integrity checks and Java's unique inheritance methods. This extra time reaps rewards in that readers get good code samples and some outstanding diagrams that make these concepts (and advantages) crystal clear.

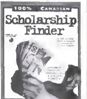
The downside is that there is a lot of material to cover. Fortunately the included illustrations and exercises are quite excellent, so after trekking through this book's more than 1 000 pages, you should be very Java savvy.

—Jacques Surveyer

CD helps university-bound students find Canadian funding sources

By Jean Allen-Ikeson

University scholarships are a means of rewarding excellence in a range of activities from academic standing to leadership or athletics. The Scholarship Finder CD-ROM brings together a database of more than 60 000 scholarships available in Canada. Many of these are not awarded simply because no one applies for them. This is particularly true for company or organization grants.



Scholarship Finder
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For: Windows
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Until the publication of this disc, much of the information about the availability of such grants was obscure. But with rapidly rising tuition rates students need to tap into these resources to finance their education or to keep student loans to a minimum. Both entrance scholarships and continuing and post-graduate scholarships are listed. While many scholarships stress academic achievement or outstanding performance in a sport many are aimed at members of visible minorities, or the children of members of a company or organization.

The disc's searchable format allows you to select search criteria to match your needs. It saves you from pouring over lists until your eyes cross! It allows you run a quick search with a few general criteria or to run a more detailed but narrower search based on an individual profile. The results include a description of each award submission information detailing where and to whom applications should be sent and a list of additional prerequisites for awards. Students may also write and print a letter to the scholarship administrator.

The Entrance Award Directory is a hard copy cousin to Scholarship Finder that only lists entrance scholarships. It is the first such product in Canada and contains more than 600 pages and lists over 4 000 entrance scholarships. Awards are indexed by activity field of study heritage and school of study.

The directory organizes information by university. Thus all the scholarships available specifically for Simon Fraser University appear together. The amount of the each award, its deadline, minimum academic standing requirements field of study school of study region of residence heritage activities affiliation, special circumstances financial need automatic consideration (yes or no) and specific details are included.

This listing is a printout of the data available on the Scholarship Finder disc. It includes details on applying for grants and a sample letter and information on budget planning and student loans. Campus Finder 2000 a CD-ROM that helps students locate the program of their choice in the geographical area in which they hope to study is included with the book. The disc was developed for the Royal Bank (it is also available from the bank's branches). Campus Finder 2000 is the economy version of School Finder.

These products are a must for guidance counselors who want to help students find scholarship sources. They are some of the most useful products to come along for high school and university students. ❑

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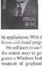
The Visual Basic Tutorials: Part 7

Back to forms



In previous tutorials we have concentrated on the "basics" of Visual Basic (VB) command and syntax—enough so that programming with VB though easy enough for most situations, would not be an impediment as we start to develop more realistic applications. With this tutorial we return to forms and visual programming.

We will learn to use VB's menu editor, one of the easiest ways to give your forms and programs a Windows look and feel plus the convenience of graphical user interface (GUI) pulldown menus It is interesting to note that more and more Web sites are incorporating menu like structures despite the fact that in HTML or JavaScript it is not nearly as convenient to create menus as it is using VB or other languages like Delphi or Java. So without further ado, let s return to VB forms

In this program we will create a simple menu with File and Edit commands Underneath the Edit menu we have four classic commands Cut, Copy, Paste and Delete. However, we implement these commands in a general way so they can be used in any program or form In order to do this, we have to know the object-naming conventions of VB as they relate to forms and the various controls/objects placed on them.

But first let us create a new project (call it menudemo and make it a standard EXE file) The first thing we will do is create the menus. Actually, this is a good design principle outline your program by first defining the main menu items, the menus then act as a skeleton of what your program is going to do. Our program is simple File | Exit and Edit | Cut | Copy | Paste | Delete are the complete commands.

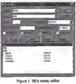


Figure 1 VB's menu editor

To start the menu editor, click on the pull down menu icon in the standard toolbar (the third icon on the right) Figure 1 shows a screen capture of the menu editor with most of the entries already filled in We have just typed in the caption &Exit and the name of the menu exit. The caption will appear on the form and the & indicates which letter (in this case the E in Exit) can be used as an Alt+key shortcut to get at the menu item.

Now we will complete the Exit menu item. See the four arrow buttons. They are used to place a menu item in the correct position in the menu outline In this case we need to move Exit down just below File but indented to the right. As you might guess, one mouse click on the menu editor s down arrow button and one click on the menu editor's right arrow key will do the trick. Note that for Exit s shortcut key we have chosen Ctrl+F4 from the menu editor's ShortCut combo box. So now the key command Ctrl+F4 will exit the program.

To program Exit, close the menu editor by clicking on OK. Note that your form now has the File and Edit menus. Click on File | Exit and it will take you into the VB editor at the following point:

```
Private Sub exit_Click()
(
End Sub
```

Type in End and you have created a proper VB exit from your program. As we shall see shortly, coding for menu items is not always this simple but, remarkably, about 10 to 20 percent of menu items involve just one to five lines of code. We shall now proceed to implement the Cut, Copy, Paste and Delete commands.

Objects for Cut, Copy, Paste, Delete

All the objects and controls on a VB form have properties which, as we have seen before, are accessible through the Properties Sheet. These same design time properties are also accessible in your VB programs. The trick is knowing how to get at them. Table 1 provides some important pre-defined names in VB for accessing not just forms and controls but also application information We shall take advantage of these pre-defined VB objects.

Remember, the way to refer to an object's property is object.property So let's change the height of our menudemo form programmatically Click on the Edit | Cut menu item and add the line of code shown below:

```
Private Sub editop_Click(Index As Integer)
Screen.ActiveForm.Height = Screen.ActiveForm.Height
+ 200
End Sub
```

Run your program and click on Edit | Cut The form will jump up in height every time you click on the Edit | Cut menu item You have just dynamically programmed your form. You can change almost any form property Change the program by adding this line of code

```
Screen.ActiveForm.Caption = "I Did This"
```

Run your program and the menu caption will change to "I Did This" and the height of the form will increase by 200 when you click on Edit | Cut. We are now ready to program the Cut, Copy, Paste and Delete commands.

To the form add two text boxes, a list box, and a combo box as shown in Figure 2. The labels are optional We are now going to program the commands so that when any text in a control is selected, you can cut, copy, paste or delete it

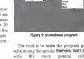


Figure 2: menudemo program

The trick is to make the program general, substituting the specific **frmForm Text1.SelText** with the more general reference **Screen.ActiveControl.SelText** By doing so, the Cut, Copy, Paste, and Delete commands will then work with any form and most controls you use

So add the following code to your program.

```
 Screen refers to the current form this could be
 referred to as Screen ActiveForm
If TypeOf Screen.ActiveControl Is TextBox Or _
TypeOf Screen.ActiveControl Is ComboBox Then
Select Case Index
Case 1  Cut
 Copy selected box onto Clipboard
Clipboard.SetText Screen.ActiveControl.SelText
 Delete selected text.
Screen.ActiveControl.SelText = ""
Case 2  Copy
 Copy selected text onto Clipboard
Clipboard.SetText Screen.ActiveControl.SelText
Case 3  Paste
 Put Clipboard text in text box
Screen.ActiveControl SelText = Clipboard GetText()
Case 4  Delete
 Delete selected text.
Screen.ActiveControl SelText = ""
End Select
End If
```

Okay I admit it, there are some more programming tricks here First in order to simplify the programming I have used menu arrays so I can then employ a Select Case statement to do all the coding in one place In Figure 1, for example, there is a third field called Index below the Caption and Name fields.

The trick is that when I created the menu items Cut, Copy, Paste, and Delete I gave them all the same Name –> editop but different indexes 1 2, 3 and 4, respectively VB then creates a menu array for me in which editop(1) is Cut, editop(2) is Copy, etc. So now the Select Case Index will choose the correct line of code to go to depending on which menu item is clicked Nifty

The second trick is to use the TypeOf … Is expression This expression allow a programmer to identify the type of control being used in an expression. Thus TypeOf Screen.ActiveControl Is TextBox returns true if the current active control is a textbox, otherwise it return false This ability to distinguish the type of control is critical because if the active control is a command button or checkbox we want to to ignore it.

Finally, we take advantage of the VB predefined object, Clipboard. VB provides a direct interface into Windows Clipboard There are also some more advanced things users can do. Check the help files for details

Now, one more detail This program is designed to allow Cut and Paste to work for text boxes, combo boxes and list boxes. But so far we do not have any code for list boxes.

A no-prize will be awarded to the first reader who solves this nasty little program. Those who want to see the solution can email me and I will send them a zip file with the complete program.

Summary

In this tutorial we have shown how to use the menu editor while creating generalized Cut, Copy, Paste and Delete commands We have also reviewed some of the predefined VB objects. In the next tutorial we get our first taste of databases and try a commercial OCX (store bought control) ☐

Resources

The book *Beginning VB6* (published by Wrox) covers VB components on pages 588-620 *VB6 Black Book* (published by Coriolis) touches on some of these topics on pages 970-975 and scattered throughout the book At my Web site there are more links to VB resources on objects and components

Jacques Surveyer is a consultant and writer He can be reached at http://www.inforamp.net/~jbsurv

Table 1

Programmable predefined Visual Basic objects

VB name of object	Purpose of object	Example
App	Currently active	App Title VB application
Clipboard	Windows Clipboard	Clipboard.setText.
Screen	All forms and control	Screen.ActiveForm currently active that VB knows
Screen.ActiveForm	Currently active form.	Screen.ActiveForm.Height.
Screen.ActiveControl	Control on currently active	Screen.ActiveControl.Font[illegible] [illegible]

Quiz

[illegible] a fabulous no-prize award [illegible] the first reader who emails me a concise [illegible] on how to get the labels to look [illegible] in Figure 2 Also, the winning [illegible] will be included in a future tutorial.

Contact Jacques at http://www.inforamp.net/~jbsurv

Excel: Quick data entry

By Helen Bradley

The data-fill command lets you quickly enter headings into cells of your Microsoft Excel spreadsheet. Use this feature to speedily add months of the year or days of the week, for example. To do this, type the first entry, e.g. January, into a cell and press Enter. Hold your mouse pointer over the bottom right corner of the cell until it changes to a cross. Click and drag to the right and notice that while you do this, the month of the year that will appear in the right-most cell appears in a small box. Continue dragging until you reach December and let go. The months of the year now appear across the row and, if you're using Excel 2000, they'll also be formatted to match the cell you began working in.

Indents and new lines

To indent text inside a cell, type the cell contents and press Enter. Now, with the cell selected, click the Increase Indent button on the Formatting toolbar to indent the cell contents. You can also begin a new line of text inside an Excel cell if you press Alt + Enter.

Changing the font—permanently

If the default font for all new Excel worksheets doesn't suit your needs, change it. To do this, select Tools, Options, General tab, set the Standard font and Size to your preferred choice and select OK. Now all new workbooks you create will be set by default to this font.

Format this ... if...

Excel's conditional formatting allows you to format the contents of a cell in different ways depending on the value of the cell or the result of a formula. For example, you can format a cell using red type if its value is below -1,000 and blue if its value is more than this. To do this choose Format, Conditional Formatting, choose Cell Value Is from the first dropdown list, Less Than from the next list and enter -1,000 in the last box. Click Format and choose Colour Red. Choose Add to create another format. Create this so it reads Cell Value Is Greater Than, -1,000 and set the text colour to Blue and click OK. Now the cell's contents will be formatted depending on its value.

Form data entry

When you have a lot of data to enter it's often easier to use a form than moving around using the cursor. To create a form for data entry, enter the headings for a table of data across a row of a worksheet. Highlight these cells and choose Data, Form. When the dialogue appears saying Excel can't determine which row in your list or selection contains column labels, choose OK to confirm that the current selection is headings and not data. The new data form will appear on the screen with prompts for each item to appear in your final table. Enter the details for the first row of data, then choose New to create the data for the next row.

Drawing attention

Draw attention to an important figure in a worksheet using a callout. To do this, display the Drawing toolbar by selecting View, Toolbars, Drawing, select the AutoShapes button, select Callouts and select a callout shape from the range. Click and drag the shape onto your worksheet and type an appropriate message in it. Move the callout into position by selecting it, position the mouse pointer so it turns into a move pointer and drag the callout into position. The callout's "point" can be moved independently to indicate the cell being referred to. Format the text and colour of the callout using the Font Colour and Line Colour buttons and add a 3D or shadow effect using the 3D or Shadow button on the Drawing toolbar.

Switching it around

Occasionally you'll have begun entering data into a worksheet before you realize it would be better in columns instead of rows, or vice versa. Rather than deleting the data and starting over, use Excel's Transpose tool to move it. To do this, select the data including all the row and column headings and select Edit, Copy. Position the cell pointer in the top left cell of a blank area of your worksheet large enough to contain the data in its new format and select Edit, Paste Special, Transpose and OK. The data will now appear in the new format with most of its original formatting (except column widths) intact. You can then remove the original data to finish. ❑

Helen Bradley specializes in writing hands-on tutorials. Her columns appear regularly in a number of publications in the U.S., Australia, the U.K., as well as The Computer Paper. She also reports on events in the computer industry for Australian Radio. Contact Helen at helen@helenbradley.com.

Mac-centric portal adds search feature

NB—MacLaunch, which bills itself as the Internet's first comprehensive portal site targeted exclusively at Apple Macintosh users, has opened its Web search engine based on the dmoz.org Open Directory Project. The service says that the addition of a Web search tool to the MacLaunch portal allows Mac users to access a database of over 1.2 million sites organized into over 193,000 different categories.

http://www.maclaunch.com

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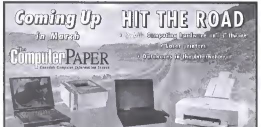
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APPLES B.C. COMPUTER SOCIETY A User Group for Macintosh and Apple II. Macintosh meetings are on 3rd Wednesday of each month at the York House School in Vancouver at 7 p.m. Newton and other special-interest groups are mid-month. Apple II meetings are on 1st Monday of each month at 7 p.m. at the Century House in New Westminster. For further information call 437-9836 or 266-4687

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EN USER GROUP For more information call 926-0284 (preferred), or voice mail 837-8318

B.C. VAX/VMS Local Users Group (BCVAXLUG) provides a forum for professional growth and education of its members through the sharing of solutions, ideas, and opinions. User group meetings are held the 3rd Wednesday of every other month at 6:30 p.m. with location to be advised. For further info please call [illegible] 276-4996

CANADIAN INTERGRAPH USERS GROUP CONFERENCE, September [illegible] 1999. Delta Meadowvale Mississauga, ON. "Drive The Open [illegible]" Contact Laura Barrman Intergraph 2912 Memorial Dr SE Calgary AB T2A 7R9 voice (403) 569-5562 Fax (403) 569-5601 e-mail [illegible]

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FOXSOFT, EDMONTON'S FOXPRO USERS GROUP-second Tuesday 7:00 pm Grant MacEwan City Centre Campus. East Wing, Room C 13th fl. 10700-104th Ave. Contact: Ken Rayner at 437-6318 or Helen Stuart at 486-3212 (days). Info bulletins on BBS 457-4109

INDEPENDENT COMPUTER CONSULTANTS ASSOCIATION OF BC The ICCA is a non-profit association of consultants who provide services in the field of Information Technology. The objectives of the ICCA are to provide a forum where consultants can network with each other, exchange ideas, and improve their business and computer skills. Monthly meetings with speakers. For further information contact us at PO Box 821, Terminal Station, Vancouver BC V6C 2N5 tel 682-2747 fax 681-0618 email: [illegible] / WWW: http://www.icca-bc.org/icca/

LOTUS NOTES — see "Pacific Notes User Group"

MACWEST COMPUTER SOCIETY Meetings for members and visitors include PD copy sessions. General meetings: 2nd Wednesday of each month. Beginner's meetings: 3rd Wednesday of each month 7:30 p.m. at Surrey Conference Centre. For messages and information call 265-4530

MS ACCESS TECHNICAL USER'S GROUP For those who want to participate in learning more about MS Access. For information call Greg Mini at 434-0292, or refer to www3.telus.net/[illegible].html

MACROMEDIA USERS GROUP This group is dedicated to networking and shared learning. The products covered include Flash, Dreamweaver, Director, Authorware, and Generator. For additional information please call (604) 173-4464 (evenings) or [illegible] at [illegible]

OBJECTS USER SOCIETY See British Columbia OpenStep Group (B.C.O.G.)

OPENSTEP USER SOCIETY (VNUS) See British Columbia OpenStep Group (B.C.O.G.)

PACIFIC NOTES USER GROUP (PACNUG) Lotus Notes users meet the last Wednesday of each month 5:15pm at Rooms on Robson on July 31st. Contact Delores Bear at 988-2141 or [illegible]

PC/MAC USER GROUP Wanted: Professional Photography/Graphic Designers to share, network and seek the finest hardware and software programs. If you are interested please contact: B. Harrington at 874-6080 or email me at [illegible] for further info.

PORT COQUITLAM COMPUTER CLUB. Commodore Amiga & IBM. 1st & 3rd Tuesday 7:30 p.m. Room 10A, George Pearkes Jr. Sec. School, 1300 Laurier Ave. Port Coquitlam. For further information contact: Ed Dyer at 942-0854

POWER BUILDER User group being formed. Meetings are planned for first Wednesday. To enroll call Perform System Developers at voice mail 604-264-0247

SQL SERVER User group being formed. Meetings are planned for first Monday. To enroll call Perform System Developers at voice mail 604-784-3647

T.I. 99/4A COMPUTER B.C. 99er Users Group, every Thursday 7:10 p.m. For information, call Ron, 522-2510

TEENS IN VANCOUVER USER GROUP For teens under the age of 16 interested in doing computer related projects regularly. WWW, programming, games, anything! The main goal is to share computer knowledge and to make friends. If there are any homeschoolers interested, that would be great. If interested, please call Orion Wall at 986-2635

VANCOUVER AUTOCAD USERS SOCIETY 1st Wed. of the month, 7:30 p.m., B.C.I.T. Bay Campus Bldg. 5766 Room 1150. Contact: Frank Zander (604) 582-8283.

VANCOUVER DELPHI DEVELOPERS ASSOCIATION meets once a month at the InfoCan Management Head Office on West 8th Ave. 1 block east of Oak St. The meeting is usually on the second or third Week of the month. Room check website for details. http://www.infocan.com/VDDA.htm The purpose of the group is to provide a common and regular forum for Delphi developers to get together and discuss Delphi related issues. Admission is free and all notices are sent via e-mail. To have your name listed to our distribution list please send your complete contact information to [illegible]. Fax: 604-736-5806 attend Maggie U (administrator) at tel. 604-736-5885.

VANCOUVER FOXPRO USER GROUP (VFUG) www.foxpro.org meeting time and location info: Kimberley at [illegible] or Jay at [illegible]

VANCOUVER GEOGRAPHIC INFORMATION SYSTEMS USER GROUP Meetings are held on the 1st Wednesday of each month September through May, at B.C.I.T. Town Square Room C at 7:30pm. Contact Dwight at 940-1516 for information

VANCOUVER KAYPRO USERS GROUP VANCOUVER PORTABLE COMPUTER CLUB

VANCOUVER NETWARE USERS GROUP (VNUG) is an official user group recognized by the Netware Users International Assoc. and supported, in part, by Novell. Meetings are held on the third Wednesday of every month at 7 pm at PNGC Computer Training Centre. Hong Kong Bank Building, 900-885 West Georgia Street. All aspects of the networking environment are discussed and presented with emphasis on the Netware network operating system. The workshop begins at 6:00pm, buffet dinner at 6:00pm, at 7:00pm is a Q&A session followed by a presentation ending at around 8:30pm. Member, non-member and student pricing applies to the workshop under dinner-presentation. For further information or planned topic announcements and our voice mail at 669-VNUG (604-8684) or Fax us at 689-8694

VANCOUVER PC USERS SOCIETY (VPCUS) 2nd Thursday 7pm at the Pacific Space Centre (the Vancouver Planetarium) members free and guests $3 admission. Excellent Q&A session & feature presentation. Our mission is to educate and inform our members and the general public on the current and future issues in personal computing and to provide a forum centred for the business, educational and personal use of microcomputers. We offer on disk newsletter, educational seminars, special interest groups (see separate VPCUS SIG listings), and more. Call 280-8464 for details and schedule

THE VANCOUVER SQL Server Users Group is an independent non-profit organization dedicated to providing an information exchange about Microsoft SQL Server. (Launching its bi-monthly meetings starting Thursday January 7 1999 from 6:30pm to 8:30pm. For more information, visit our web site at www.vansug.org. Phone: 939-9434

VPCUS CLARION-TOPSPEED SIG — Clarion is a full-featured industrial-strength DOS & Windows application development tool. Its superior high level language and re-usable templates produce compilable code and tight EXE's that run fast and are royalty free. This lively SIG attracts a range of participants from seasoned professional programmers to new users and the curious. Meets the 1st Wednesday of every month in Metrotown. Contact: June Gallo, 736-7792.

VPCUS DBUG (Data Base Users Group) Emphasis is on solving problems of data management with special reference to Paradox. Bring a blank 3.5 inch disk to pick up planned from the meeting. Meetings for the next few months will be informal, and meet at a local pub. Contact Brad Froese 937-7222, or [illegible]

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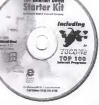

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Intel.Play Me2Cam puts kids in the game

EL SEGUNDO, Calif.—Mattel and Intel have announced the release of their latest toy, the Me2Cam Computer Video Camera, which allows kids to use their own images in various computer games.

As the name suggests, the US$69 toy is a computer peripheral that functions as a digital camera, sitting on top of a computer monitor like a Web cam. It comes with a CD-ROM of games in which the player uses their own image and controls the onscreen action with body movements that are fed into the PC via the camera.

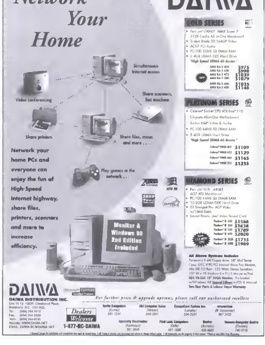
The software processes the images, removing the child's environment and replacing it with one of five animated worlds, such as a ski slope with obstacles or a dance club complete with a virtual band. When the child steps back in front of the camera, he or she appears on screen inside the animated world. Intel Play says it is suitable for kids of four years and older.

Minimum system requirements for the Me2Cam system include a 233 MHz Celeron or Pentium-driven PC, a USB port, Windows 98, an 8x-CD-ROM drive, and 65 MB of free hard disk space.

While the Me2Cam won't be shipping until March, more information and a "test drive" of the Me2Cam camera are available at the Intel Play Web site.

The Me2Cam is the second toy Intel has released under its Intel Play brand (http://www.intelplay.com). The first was the popular QX3 computer microscope, which was released last fall. Plans call for the companies to develop other Intel Play toys for release later this year.

—*Newsbytes*



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March	Hit the Road: Mobile Computing hardware and software	Laser Printers	Databases in the Internet era	Tues. Feb 1	Wed. Feb 2	Fri. Feb 18
April	Convergence at home: TVs, PCs and Phones, oh my!	Offline video editors	Tools for Collaboration	Tues. Feb 29	Wed. Mar 1	Fri. Mar 17
May	Tuning up your computer: Tools and techniques to improve your computing	Storage	Backup and archiving	Tues. Mar 28	Wed. Mar 29	Fri. Apr 14
June	Working the Web: Tools for personal fame and fortune	Inkjet printers	Security Tools and Techniques	Tues. May 2	Wed May 3	Fri. May 19
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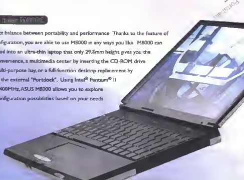

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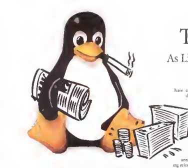
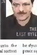


The new nerd order

As Linux frenzy peaks, geeks rule the world, or at least the stock market



At the end of 1999, just when you thought it couldn't get any sillier, the investment community's absurd over valuation of the Internet stock market morphed in a new direction—absurd over-valuation of Linux stocks With bewildering rapidity, a combination of techno-optimism and greed for a quick easy buck pushed anything associated with Linux into the headlines of every financial section in print or online.

The Linux bubble can probably be said to have begun in earnest early in the fall of '99 The pioneering Linux software publisher Red Hat chose to make its initial public offering (IPO) of company stock during the annual Linux World show when media attention was briefly concentrated on the Linux phenomenon. This was an inspired, if opportunistic, stroke of marketing genius. The widely publicized and rapid runup in Red Hat stock price that resulted gave a powerful signal to investors that Linux was likely to be an interesting stock play.

At the same time, the Red Hat phenomenon highlighted some of the ironic contradictions of Linux becoming the next big thing for the get rich quick crowd. Linux wasn't supposed to be about money It was supposed to be about freedom from the Microsoft monopoly The open source software movement began as an anti capitalist, neo hippy alternative to the increasing impersonalization of personal computing.

There has always been a utopian subculture within computing, devoted to "making information free," and to playfully gumming up the gears of big business and big government Very bright people devoted their time and talent to writing and sharing Linux software code, and offering debugging and technical support services to Linux using strangers for free without any nonsense about copyright or intellectual property As 1999 drew to a close, however, the communitarian ethic of Linux appeared to be dying as dollar signs replaced peace signs in Linux lovers' eyes

Make millions off free software!
The Linux frenzy was further stoked by uncertainty about the future of Microsoft, as the initial findings of fact in the U.S government's anti trust prosecution of the software giant led to charges, and rumours of a breakup of the company At the same time, Canadian software publisher Corel began to publicly demonstrate an impressive new graphical version of Linux for mainstream PC users. Corel's stock price shot up from its dismal 1998 low of $1.35, to a record high of over $60

> Corel's stock price shot up from its dismal 1998 low of $1.35, to a record high of over $60

A flood of other major PC companies made Linux announcements just as the year ended. Adobe announced Linux versions of its Acrobat and FrameMaker programs World leading graphics chip maker ATI announced formal support for Linux, as did Creative Labs. The support of two of the leading multimedia hardware makers meant Linux users could have confidence that Linux device drivers for much of the most commonly used hardware such as graphics cards, DVD drives, and sound cards would likely be available

Inprise, the owners of the Borland line of software development tools, announced the forthcoming release of a Linux development environment code-named Kylix, which would radically speed development of new Linux software titles.

IBM continued to strongly promote Linux, happily giving away "free" Linux software, while charging full pop for hardware, peripherals training support, services, maintenance, upgrades, and applications programs

The shape of the new business model for Linux quickly became clear give away the Linux operating system for free, and charge regular prices for everything else. Ironically, this points out a simple reality that the Microsoft haters prefer to ignore, which is that the cost of buying the Microsoft Windows operating system is a minuscule percentage of the total cost of ownership of a PC

The main selling point Linux has is that it is a compact, nearly crash proof alternative to Windows. Its main limitation is the small number of mainstream software applications currently available in Linux format Nevertheless, there is ever more reason to regard Linux as a mainstream end user operating system. A substantial library of native Linux applications software should be available to end users by the end of this year

Casino capitalism Buy low, sell high—and cash out
The gold rush mentality now engulfing Linux in many cases is attracting eager investors to buy into Linux-related companies before those companies have demonstrated any real ability to make money This latest Linux stock market "bubble" is exploiting investors optimism—or herd instinct—in much the same way as the Internet bubble did.

Both of these recent technology-related stock market manias have created thousands of paper millionaires, and a good many paper billionaires, over the past two years The Internet and Linux bubbles continue to work their magic, because unlike other investment bubbles of the past, such as the Dutch tulip mania of the 17th century, or the South Sea bubble, or the Florida real estate bubble of the 1920s, today's technology investment bubbles are based on something real

The Internet bubble is riding on the wiring of the world, and the complete reorganization of every aspect of world business that it is bringing about. Linux is riding on its potential to bust the Microsoft dominated computing world of the past 15 years wide open, and become the basis of this new century's computer market.

However, the fact that there is something real under the hype doesn't mean that investing in the bubble is safe. For one thing, the IPO industry in the U.S. is a monumental insider scam, where the big players have access to the stocks as they are issued, pocket the initial profits, and "cash out," selling the stocks at inflated prices to smaller investors.

In order for one group of stock market players to make a huge profit from flipping Linux stock vast sums of money are being transferred out of the pockets of another set of investors Every time the market makes a "correction" and prices drop, vast numbers of people lose their shirts.

On the Linux merry go round, you aren't really rich until you have dumped your stock, paid your taxes, and counted what's left over in your bank account It's certain that many people have made money from the Linux market but it's also a simple fact that they haven't done it on the basis of selling Linux related software to end users Rather, they've pocketed money from investors who may, or may not someday get their money back.

It's the rich get all the gravy; It's the poor wot gets the blame
My total personal stock portfolio consists of one share of Hudson's Bay Company stock that I was given as a child. Its current value is around $20, the same as it was 30 years ago The annual dividend cheques (generally well under $1 per year) are probably still being mailed to the address where I lived 30 years ago.

So when I give an opinion on the high tech stock market, it is not from the point of view of a player For what it's worth, I predict that the Linux software platform will do very well in 2000, acquiring millions of new users, and attracting an increasing third-party developer community I think that smart and ruthless insiders will make a lot of money from Linux stocks, while quite a few small investors will get burned, while some will get lucky riding the Linux wave.

Linux as a computing platform is pretty close to a sure thing. Linux as an investment goldmine however, is only about as reliable as a trip to Las Vegas ❑

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